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ABSTRACT

As the nations of the world pursue development, the role of culture is important to consider in development activities. This report examines the link between culture and development and suggests that a people's cultural traditions and practices can be utilized in successful development activities. The investigation functions on the premise that throughout history, and across all cultures, a people's culture has been linked intimately to its development and that this link was broken in recent times, especially in developing countries because of the universal adoption of the western development model and because of the internationalization of western technology. The report discusses the interactions among culture, technology, and development. The experiences of currently developed and developing countries are compared with regard to the role of culture in development. The conclusion indicates that many cultural traditions can be employed to facilitate development and that individual nations must decide to what degree cultural attributes will be utilized in development activities. The characteristics of cultures that favor success in development include: (1) cultural confidence; (2) inventiveness and innovation; (3) creativity; (4) political will and encouragement; (5) importance accorded to knowledge and education; and (6) social rewards for individual success. Additionally, an extensive bibliography lists other materials on cultural and developmental issues. Contains 36 references. (Author/CK)

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Culture and Development

A Study

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INTRODUCTION

The present study was written with the non-specialist reader in mind. It is an attempt to stimulate an examination, or re-examination of the role of culture in development. It is based on the premise that throughout history, and across all cultures, a people's culture has always been intimately linked to its development, and that that link was broken in recent times, especially in developing countries, because of the universal adoption of the Western model of development, and because of the internationalization of western technology.

The study also attempts to demonstrate that a people's cultural traditions and practices can be utilized successfully in development action. In this respect, frequent reference is made to Japan not only because of that country's outstanding achievements in this field in recent times, but also because it is the most striking example of the role cultural traditions have played in successful development.

Although, in the chapter on the Development Challenge, suggestions are made of the types of action that could usefully be considered by developing countries, each country needs to determine for itself, from its own cultural perspective, how best to utilize its cultural attributes in its development action.

In such a deliberately concise study, on a subject as broad as the present one, a certain level of generalization, and of simplification, is inevitable where in-depth examination of issues is not feasible. This is particularly true of the chapter on the Concept of Development.

The views expressed in this document, the selection of facts presented and the opinions stated with respect to those facts, are the responsibility of the author and do not necessarily reflect the views of UNESCO.

1. THE CONCEPT OF DEVELOPMENT

No country, whatever its history, its cultural traditions and antecedents, can currently afford to reject, or ignore, the prevailing, dominant concept of development[1] based on the western-originated idea of human progress, and of which the broad aim is to increase the standard of living of its people as a whole. The crucially important question facing all countries, however, is how best to achieve this. The western model of development[2], which is predominantly an economic one, was conceived and applied in Europe before it was exported. Although its value and effectiveness are increasingly being challenged in the West itself because of the social and economic distortions caused by it, especially in the last two decades, it must be remembered that the model is totally indigenous to the West - a product of western civilisation and culture.

This claim cannot be made for the vast majority of the countries to which the western model was exported, where it has proved largely a failure, and the imposition of which has produced ruptures rather than distortions - rupture of traditions, rupture of socio-cultural and socio-economic systems, etc. The western industrialized countries possess, however, internal mechanisms for correcting such distortions. The developing countries[3] do not, because this imported model was not grafted on to local traditions but, instead, wrought a rupture with those very traditions which effectively prevented it from taking root in the local culture. If the latter had occurred, the imported model would have been given autonomous life, without the need for an external support system, which would thus have allowed the development of internal mechanisms to give warning, and permit self-correcting action, when things began to go wrong.

The question of development presented itself as a general and multi-dimensional problem only with the post-independence experience of a large number of countries in the 1960's whose "development" up to then had not been undertaken for the benefit of their peoples but, instead, in the interests of those metropolitan countries possessing colonial empires.

The newly-independent countries applied the "made-in-the-West" model of development, a model which assimilated development to economic growth, and whose underlying values, rooted as they were in western culture, prevented successful transplantation to the very different socio-cultural structures of developing countries.

The economic success of western countries together with the political, cultural and military advantages that accompanied that success, exercised an enormous fascination in the non-western world that not only led many countries to adopt the western model of

development but also to regard it as the only valid one, for which it was necessary to adopt western forms of economic and social organization and also the lifestyles that were considered to be inseparable from them.

The western model of development spread rapidly in the 19th and 20th centuries, succeeding in exercising a dominant influence throughout most of the world, largely through colonisation and trade. In its wake, came western technology, ideas and values which exercised such influence that the West came to believe in the general superiority of its own culture. It was not alone in doing so. What was equally important, however, in terms of its subsequent effect, was the conviction, on the part of both western and non-western countries, that the western model of development was a universal one - a mechanism that was not only neutral but also the most effective one for ensuring development.

Far from this being the case, however, even the concept of development itself is not culturally neutral. It is rooted in the western idea of progress which, combined with the idea of individual independence, the first signs of which appeared with the disintegration of European feudal society, was given an impetus by the ideas of the Renaissance and developed, from the 18th century onwards, into an individualism and a sense of competitiveness that was applied to the accumulation of wealth.

Protestantism played an important part in the formulation of this particular concept of development. In bringing about a spiritual liberation in which man was expected to assume his own individual responsibility to God, it provided a theological basis for the individualism which, later, received philosophical support from the liberal ideas of the Age of Enlightenment. Furthermore, Calvinism, breaking away from the traditional Christian mistrust of wealth inspired by Christ's teaching that it was easier for a camel to pass through the eye of a needle than for a rich man to enter Heaven, gave religious support to the accumulation of wealth, by claiming that success in doing so was a sign of God's blessing.

Calvinism frowned upon ostentatious display and conspicuous consumption placing, at the same time, great importance on thrift and hard work. Wealth plus thrift led to increased savings. With the ethic of hard work, this formula produced ever increasing profits and savings which in turn produced a surplus for investment. The classic components of capitalism were now in place. Together with the triumph of individualism, it laid the foundation for an economic system and a development model based on free enterprise, free competition, economic efficiency and profit maximisation.

The western model of development was therefore an endogenous one, born of the changed nature of social relationships whose distant origins lay in the disintegration of feudalism, inspired by the values of the Renaissance and the Enlightenment, and stimulated by the dynamic of the conflict between Catholicism and Protestantism which produced profound changes in European cultural values.

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This model of development, which spread to all parts of the non-Western world in the 19th and 20th centuries, found itself in confrontation with societies whose traditions and cultural values were totally different from those of the West, though they had much in common with feudal Europe. The needs of those societies were stable and, as a result, production was small since there was no need to build up surpluses for investment. What was produced was consumed or largely spent in non-productive activities such as religious celebrations, weddings and other types of ceremonies. These societies were governed by rules which fixed the status of members and groups in the society and their relationship with others. There was little or no evolution in such relationships, little or no scope for self-betterment and thus no incentive for individual competition. Since the individual's role within the group, whether family or clan, was the main criterion of his value as a person, individual interests were subordinated to those of the group. It was natural, therefore, that decisions were arrived at on a consensual basis and not, as in the West, on a conflictual and competitive basis.

1.1. The Western model applied in the colonial context

The capitalistic system, based as it was on an ever-increasing production of goods, discovering new markets for these, exploiting cheaper sources of raw materials and cheaper labour in order to maximize profits, developed the colonial system as a means of helping to achieve these ends. Mercantilism, which had held sway in the 17th and 18th centuries, had been based on the theory that colonies existed for the benefit of the "mother" country and were useless unless they were profitable.

As a result, the economies of the colonies were exploited not in their own interests but for the benefit of the "mother" countries. In this respect, John Stuart Mill, the English political economist whose writings had a major influence on 19th century economic thought, could not have been more frank: "These [outlying possessions of ours] are hardly to be looked upon as countries... but more properly as outlying agricultural or manufacturing estates belonging to a larger community. Our West Indies colonies, for example, cannot be regarded as countries with a productive capital of their own... [but are rather] the place where England finds it convenient to carry on the production of sugar, coffee and a few other tropical commodities."[4]

The economies of the colonies were organized for the low cost production of raw materials which were then exported to the "mother" countries for processing, after which the finished products were re-exported to the colonies. This system greatly distorted the colonial economies, for it resulted in an economically unhealthy situation where what was produced in the colonies was not consumed there, and what was consumed there was not produced there. Furthermore, the plantation system, which was a feature of this type of relationship, often resulted in single-crop economies, the negative effects of which are still apparent in many former colonies.

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A country's economic development depends, basically, on the surplus it produces and on the re-investment of as much of that surplus as possible. During the colonial period, almost all the surplus production of the colonies was expatriated, leaving little or none for re-investment.

The industrial policies of the developed countries, especially during the period of colonial domination, destroyed the more dynamic artisanal activities of developing countries which, at a comparative stage of the former's own development, were the foundation on which the developed countries themselves had constructed their own economic development.

The colonial system did not favour, and invariably forbade, any form of local manufacture which would compete with those of the metropolitan countries e.g. the local refining of sugar or the manufacture of textiles from cotton. Thus there was no opportunity for the colonies to develop new, local technologies, or to improve those which had existed prior to colonialism. The seeds of the developing world's technological dependence on the West were sown in the colonial era.

1.2. The Western model in the post-colonial era

The development strategies adopted by the newly-independent countries were designed to recreate, in those countries, the highly urbanized and industrialized societies of the West. The political, economic and social structures, however, which had permitted the success of their model of development, did not exist in the developing countries. The conviction that the western model was a universally valid one was based on the assumption that, being an essentially economic model, only economic considerations would need to be taken into account, as well as on a profound incomprehension of the importance of the socio-cultural forces which had determined the characteristics and nature of that model.

The specific, and different, socio-cultural characteristics of the developing-countries' societies were ignored, and development policies were applied just as if the societies concerned were developed and not developing ones. The western industrial model, a product of highly urbanized societies, when applied in developing countries where most people lived off the land, distorted the local economies by policies favouring the city over the rural areas which encouraged massive urban migration. Until quite recently, the industrial societies were able to absorb this rural exodus in their urban-based industries. The developing countries were never in a position to do so.

This very model, during the period when it was applied in the Third World in its purest form (1960's), was based on capital-intensive technology, reflecting conditions particular to the West which had an abundance of capital and a shortage of labour in those boom years, while labour-intensive technology would have been more appropriate to the developing countries with their shortage of capital and abundance of labour. Furthermore, capital-intensive technology of the type developed in the West required a high level of basic

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education and training on the part of the labour force, as well as specific technological skills, which were lacking in most developing countries with their high rates of illiteracy, and education systems more adapted to providing a literary education than a technological one.

The forms of industrial and business organization required by the economic culture prevailing in the West, and which were indissociable from the economic model of development exported to developing countries, demanded a particular type of managerial experience and expertise that was lacking in the developing world. The division of labour in developing countries was traditionally organized according to the product, while that in the industrialized countries was organized according to the process divided, as it often was, into various stages. This latter division of labour, apart from being alien to the traditions of developing societies, required a high degree of management and a level of planning, co-ordination and supervision which most developing countries found difficult to achieve.

The type of science and technology that came with industrialization was disruptive of traditional societies to the extent that it could not be naturally incorporated into the systems of cultural values of those societies. The most important factors in the conflict between science and the value systems of traditional societies are the critical spirit and the concept of systematic growth. Knowledge based on beliefs and on limited, empirical knowledge that had not been subjected to systematic analysis, found itself confronted with a scientific system, based on reasoning and experimentation, whose critical method of investigation gave it the capacity for steady development. This dynamic aspect of western science gave it an advantage over traditional forms of knowledge which, by nature, evolve very slowly.

This type of conflict had also occurred in developed countries in the early stages of their industrialization. The adjustment of the traditional forms of knowledge to the modern scientific ones introduced by industrialization took place, however, over a long period thus permitting a gradual transformation with less disruption of traditions than occurred in developing countries which tried to compress this transformation into a few decades. Furthermore, in the industrialized countries, technological innovations were introduced step by step, each innovation based on the fund of knowledge and experience previously acquired, which facilitated their cultural and social assimilation. The developing societies, on the other hand, found themselves in a situation of having to assimilate technology, which was the end product of a long process of technological innovation and development, in which they had not participated and which they, therefore, found difficult to integrate into their socio-cultural structures.

1.3. The Endogenous approach to development

The endogenous approach to development requires that the socio-cultural context in which development is to take place, be taken into account, as well as the specific conditions that relate to the particular culture, in the anthropological sense of the term: concepts, modes and styles of life, national value systems, modes of social organization, etc. This approach

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is aimed at meeting the real needs of the people concerned. It is based, for the most part, on their own creative capacity, their own values and potentialities, their own forms of cultural expression, and is directed to fulfilling their own aspirations. The endogenous approach accords the beneficiary population an active role in their own technological development, and ensures that this is fully integrated into their own socio-cultural structures.

For this approach to succeed it should ensure as full a participation as possible of the population concerned. It should also take into consideration the political, social and economic consequences of the changes likely to be brought about by the desired development. Such an approach assumes that there is no ideal solution to the problem of development, and that there is no standard model for achieving it. The policies and strategies that would need to be adopted would necessarily differ, therefore, from country to country and from situation to situation.

All cultures comprise static and dynamic elements, both of which are necessary for their stability and their development. The endogenous approach takes account of both types of elements, deriving its authenticity from the one and utilizing the other as a vector of change, while ensuring at the same time that such change as is brought about is not too abrupt or too traumatic so as to encourage rejection by the society.

Any development implies change, and development aimed at modernizing a society is impossible without profound changes taking place in its socio-cultural structures. For such change to be successful, however, it must come from forces within the society even though it may be stimulated and influenced by forces external to the society itself. What is essential is that changes in the structure of the society be part of a natural internal process, or at least be seen as such by the society concerned.

The problems encountered by Third World countries in their development efforts in the last three decades have gradually led to a re-examination of the whole concept of development, and to a growing recognition of the complexity of the forces involved which had hitherto been considered only in economic terms. It is as a result of such a reassessment that the importance of the cultural dimension of development has come to be accepted, at least at the international level, especially by those agencies, both bilateral and multilateral, actively engaged in development projects, policies and strategies.

1.4. The Cultural Dimension

The word culture, which comes from "cultus", the latin word for worship, originally meant reverential homage. Subsequently, it was used to describe the practice of cultivating the soil, which was later extended to the cultivation and refinement of mind and manners. Finally, by the 19th century, "culture" had become a term used to describe the intellectual and aesthetic aspects of civilization. It is the legacy of this very narrow interpretation of culture, inherited from the 19th century, which has caused misunderstanding of the concept

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of the cultural dimension of development, and created obstacles to the efforts of UNESCO to persuade developing-country governments to apply the concept to their development planning. Another source of misunderstanding is the title of the Decade itself - "World Decade for Cultural Development" - and its first objective: "acknowledging the cultural dimension of development", which have resulted in some confusion of the term cultural dimension of development, and the ideas conveyed by it, with that of cultural development itself.

UNESCO defines culture as including "the whole complex of distinctive, spiritual, material, intellectual and emotional features that characterize a society or social group. It includes not only arts and letters, but also modes of life, the fundamental rights of the human being, value systems, traditions and beliefs".[5] It is the scope of this definition which provides the framework for the concept of the cultural dimension of development.

Merely taking the cultural dimension into account, however, relegates culture to a secondary role. The cultural dimension is not a dimension like any other, one of a series of factors which, taken together, constitute the elements of development. It is, on the contrary, the fundamental factor in development which provides the basic reference by which all other factors are measured. It means, therefore, that there can be no really successful or sustainable development that does not recognize, and utilize, culture's vitalizing force, and which ignores the lifestyles, value systems, traditions, beliefs, knowledge and skills of the community. Development planners need to possess a thorough knowledge of their society and their culture not only to be able to ensure that their economic policies respond to the needs and aspirations of the communities concerned but also to be able to harness, for the successful implementation of those very policies, that indefinable but dynamic force that constitutes the identity of a people and which is the strategic element in any culture.

A development strategy, incorporating the cultural dimension, constitutes an integrated approach to development which comprises not only concrete development action in key areas such as education, communication, science and technology, agriculture, housing, health, etc., but also seeks to utilize the creative energies of the people in finding local solutions to the problems encountered in those areas. The experience of Japan has shown that a country can be eclectic in its choice of development models and techniques provided that they are culturally assimilable.

In the type of development which ignores the cultural dimension, and which depends on the application of external models, the creative capacities of the local culture are stunted, the capacity of the society to resist the unwanted intrusion of foreign cultural influences and models is weakened, and this produces such cultural anomalies as the wearing of imported clothes designed for a totally different climate (in the South, never in the North), the supplanting of local staple foods by those based on products that need to be imported e.g. bread made from wheat flour, the substitution of imported dried milk for feeding babies (with often disastrous consequences) for mother's milk, and the construction of sealed-in

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skyscrapers in tropical countries, based on models designed for cold climates whose *raison d'être* is to conserve as much heat as possible.

Culture has also been defined as "a comprehensive interpretation of nature, a whole system of understanding and changing the world. Culture comprises all the productive expressions of man, technological, economic, artistic and domestic. It implies a systematic relationship between every aspect of life as it is lived".[6]

Such a definition, which coincides with UNESCO's concept of culture, would indicate that instead of culture being a dimension of development, it is rather development that should be regarded as a dimension, or phenomenon, of culture. Indeed, since a people's culture represents the totality of their framework of reference for living, it incorporates all the possible responses a people could make to the demands of their own living environment.

1.5. Culture and Development

Development can only flourish where it is rooted in the culture and tradition of each country, since it is an all-encompassing process "linked to each society's own values and calling for an active participation of individuals and groups who are both the authors and the beneficiaries of it".[7]

Throughout history, cultural development and economic development have maintained a dialectical relationship with each other. History shows that periods of cultural flowering, or of creative energy, have almost invariably accompanied, or preceded, a spectacular development[8] of the society. When we look back at the Renaissance we think of a period in which literature and the arts flourished. But the creative energy released during the Renaissance stimulated intellectual enquiry and the search for knowledge, leading to developments in science and technology which eventually paved the way for the Industrial Revolution.

China under the Sung Dynasty (960-1299 A.D.) was the most advanced country in the world. It was the most highly populated, the most urbanized, the most technologically advanced, and had reached a level of development not achieved by any European country until the 18th century. This period coincided with the flowering of the arts and literature, the latter stimulated by the printing, in 953 A.D., of the 130 volumes of the works of Confucius.

The science historian, Charles Singer, in his eight volume History of Technology (ed.), stated that in skill and inventiveness during most of the period between 500 A.D. and 1500 A.D.: "The Near East was superior to the West... For nearly all branches of technology the best products available to the West were those of the Near East... Technologically, the West had little to bring to the Near East. The technological movement was in the other direction. Between the 7th and 13th centuries A.D., Europe exported raw materials to the Arab countries in exchange for consumer and industrial goods.... Egyptian

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and Syrian glass and metal work, as well as many of the products of Mesopotamia and Moorish Spain were highly prized as being manifestly superior to anything that could be made in Western Europe.... There were emigrations of Eastern craftsmen to the West. These taught their methods to European pupils and apprentices and so added the technical traditions of their own lands to those already being practised in Latin Christendom."[9]

It is interesting to note that probably the first, recorded, formal agreement for the transfer of technology which has come, almost by definition, to describe a North-South flow, actually took place in a South-North or East-West direction. In June 1277 A.D., a treaty was signed between Behemond VII, Prince of Antioch, and Jacopo Contarini, the Doge of Venice. It was through this treaty that the secrets of Syrian glass-blowing technology were acquired by Venice, which imported, directly from Syria, both raw materials and craftsmen.[10] Venice subsequently guarded the technology jealously, monopolizing European glass manufacture for four centuries until France, in the 17th century, succeeded in smuggling the technology out of Venice, utilizing it to establish the glass manufacturing firm St. Gobain, which has subsequently grown into one of France's industrial giants.

The period of Arab industrial and technological dominance, which immediately preceded the period of European dominance was also accompanied by a spectacular cultural effervescence and outpouring of creative energy. Having learnt from Chinese prisoners of war how to make paper, the Arabs established factories for paper-making in Baghdad at the end of the 8th century A.D., five hundred years before Europe learnt to make paper, and there were floating paper mills on the Tigris river by the 10th century.

The Arab acquisition of paper-making technology sparked a cultural revolution which led to the spread of learning and knowledge. Paper became inexpensive, and by the 9th century A.D., hundreds of thousands of manuscripts had spread throughout the Islamic world. At the end of that century there were more than a hundred places in Baghdad where books were made, and at the time of the Mongol conquest in A.D. 1258, Baghdad was reported to contain at least 36 public libraries. Between the 9th and 13th centuries A.D., Arabic could, quite accurately, have been described as the language of civilization in the same way Latin had been before it, and was to become so again afterwards until the emergence of national languages in Europe.

This symbiosis between culture and development is also illustrated in the case of the 14th century African empire of Mali. In his Atlas of Africa, produced in 1375, Abraham Cresques, the Majorcan cartographer, shows the Emperor of Mali seated in majesty on his throne, holding an orb and sceptre, while the traders of all North Africa made their way towards his country's markets. The maritime nations of Southern Europe recognized Mali, at the time, as one of the great empires of the modern world. In the 14th century Mali gold fuelled the trade of half the civilized world, and provided the metal for Europe's first gold currencies since Roman times[11]. Timbuktu, the capital of Mali, was described a century and a half later by Leo Africanus, as a city of learning and letters. He noted the big market for manuscript books, and reported that more profit was made from the sale of books

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than from any other merchandise. The Malian cities of Timbuktu and Jenne became, under Emperor Mansa Musa in the 14th century, places of scholarship and learning, and the reputation of their schools of Theology and Law was well-known in the furthest parts of Moslem Asia.

Turning to pre-Columbian America, the Maya civilization, which dominated Central America for almost a thousand years, had several outstanding achievements to its credit. The Mayas had developed an extraordinary monolithic, sculptural art as well as a system of writing. Several centuries before the Christian era, the Maya had devised a system of positional numeration in arithmetic, including the conception and use of the mathematical quantity of zero[12] (also independently invented by Ancient India and by Mesopotamia) which, taken together, has been described as one of the most brilliant inventions of the human mind. It has also been pointed out that the Maya civilization was probably the first to have created a model of urban structure adapted to the ecological conditions of the tropical jungle[13]. It was in the jungle lowlands, and not in the more temperate highlands, that Maya architecture attained its highest and purest expression.

With respect to the Aztecs, their empire had reached its zenith by the early 16th century, which did not prevent it, however, from falling victim to the superior technology of the Spanish invaders and to the ravages of smallpox of which the latter were immune carriers but which devastated the Mexican population[14]. Aztec civilization dazzled the Spaniards and Cortes declared Tenochtitlán, the Aztec capital, to be "the most beautiful city in the world", comparing it to Venice although it was, in size, larger than any city in contemporary Europe. When the German painter Albrecht Dürer saw, in Brussels in 1520, the Mexican art work sent by Cortes to Emperor Charles V, he wrote in his diary: "I cannot remember seeing anything in my life which has delighted me as much. There were really prodigious works of art, and I marvelled at the subtle genius of men in distant lands. I cannot find the words to describe what I have seen."[15]

Different cultures perceive the world differently, and these different perceptions, which are almost always based on objective data and situations such as, for example, natural phenomena or the natural environment, give rise to different interpretations in different cultural contexts. The various techniques, developed and applied by peoples in the past, to solve practical problems with similar results, in such areas for example as navigation, agriculture, medicine, shelter, etc. have demonstrated not only that similar problems can be solved in different ways but also that the type of solution arrived at is often inspired by the natural or cultural environment.

The birth and development, at the dawn of human history, of all the first great civilizations of the World, on the banks of great rivers such as the Indus, the Euphrates, the Yangtse, the Tigris, the Nile, etc. is not a haphazard coincidence but rather reflects the interdependence of culture, the environment and development, which also explains why Northern Europe was not the site of one of these early great civilizations. The particular

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characteristics of early regional cultures would have been determined, therefore, by the way they accommodated to, and anticipated, the working of their local ecosystems.

Basil Davidson, the English historian, who has devoted his life to the study of African history, describes the chain of cause and effect admirably: "Early civilizations all took their rise in great river valleys which shaped the characteristics of natural irrigation and soil renewal. Annually, these rivers offered new rich soil for cultivation. They enabled nomadic man, then discovering the possibility of growing food rather than merely collecting or hunting it, to give up his nomadic life. In settling for several years at a stretch, he was faced with the technical problems of regular cultivation. In solving these problems, he also solved the problem of growing a surplus of food. With surplus food the foundation of commerce was laid, which, in turn was the foundation for permanent settlement. Permanent settlement meant specialization, the division of labour and the growth of cities which, in turn, meant civilization and the development of central government."[16]

The cultural influence on development and on the environment is shown, for example, by the ecological similarity and the cultural differences between southern catholic Spain and northern islamic Morocco where different techniques and types of agriculture and animal husbandry have been developed.[17]

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2. CULTURE AS A VEHICLE FOR CHANGE

2.1. Culture and Change

Every society attempts to order its existence in accordance with its world view, for which its views on creation, the purpose of life and on an after-life provide the initial and principal inspiration. What accounts for the fact that in history some civilizations have developed faster than others? One of the reasons may be the world view of some peoples who felt that the apogee of their society's achievement was situated at some distant time in the past and that they could not surpass or even attain it again, nor, indeed, should they even attempt to do so. Another reason, historically, could have been the feeling that once a certain harmony had been attained between a community and its environment, and a reasonable balance achieved between the needs of the community and the satisfaction of those needs, there was no reason to alter the situation. Yet another reason could have been the influence of an attitude of fatalism which would negate the need, and usefulness, of human endeavour beyond what was necessary for mere survival.

The world view could also, as it did in the West, foster a belief in the idea of progress and in the capacity of man to dominate his environment and improve his condition. This last attitude was especially prevalent in the predominantly protestant countries and communities, stimulating the search for knowledge, and ways in which to apply that knowledge for man's betterment, generally unhampered by theological considerations. Most of the inventors and scientists of the period from the Reformation to the Industrial Revolution were Calvinists, Puritans and, in England, Dissenters.

Why have certain countries and cultures, at particular times in their history, developed more successfully than others, though apparently sharing similar objective circumstances as well as similar objectives? As has been indicated earlier, periods of spectacular development always seem to be accompanied, or preceded, by outbursts of creative activity and cultural energy. This is almost always evidence of a certain cultural confidence -intangible, elusive, unpredictable, but apparently, a necessary precondition for the daring and imaginative action that endows a people at a given moment in their history, like an individual athlete enjoying a boost of self-confidence, with the capacity to surpass others in their achievements.

Claude Lévi-Strauss, the French anthropologist, has pointed out that all cultures are composed of a mixture of exchanges and borrowings. One of the factors that appear to play a role in successful development is a culture's openess to other ideas, and a willingness as well as a capacity to assimilate those of other cultures. If changes caused by the relationship between culture and development are influenced both by internal and external factors, then a society on the defensive, and closed in on itself, reduces its chances of benefiting from external influences.

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The genius of Europe is that it has never, before now, fallen into the error of turning in on itself. Not only has it always, in the past, remained open to other cultural influences, but it has seldom hesitated in accepting the best that other cultures have had to offer, which is amply demonstrated by the scale and importance of its borrowings from other cultures.

Michel Leiris, the French ethnologist, illustrates this admirably:

> "The peoples of Europe -whose overseas expansion, be it remembered, is of very recent date, today restricted by the evolution of the very peoples they formerly surpassed in technique- owed their cultural lead to the opportunities they have long had of frequent contacts among themselves and with contrasting groups. The Romans, who may be regarded as the founders of the first major State to exist in Europe, borrowed from Asia in the construction of their Empire, and their only enduring successor, the Byzantine Empire, owed more of its administrative organization to Persia than to Rome. Conversely, the relative isolation of Africans for so many ages should be an added reason for admiring their success, despite these adverse conditions, in founding, before the fifteenth century, such a State as Benin (a prosperous kingdom which produced masterpieces in bronze and ivory in an age when Europe cannot have supplied the Negro artists with models), or making sixteenth century Timbuctoo, the capital of the Songoi Empire, one of the principal intellectual centres of the Muslim world. Not merely for Africa's sake, but for that of the rest of the world, it is regrettable that the rapid expansion of the European nations, at a period when the material equipment available to them was out of all proportion to those in the hands of other people, should have nipped in the bud a score of cultures whose full potentialities we shall never know".[13]

A society that is culturally confident would be more open to external influences and would therefore derive greater benefit from them, while a society on the defensive would put greater importance on sterile tradition, resenting any change caused by external forces, and repressing any elements in the society advocating such change. After the brilliance of the T'ang and Sung dynasties, China closed in on itself during the Ming Dynasty, refusing contact with the outside world. China made it a capital offense for any Chinese subject to travel abroad, and forbade the construction of ocean-going ships although it led the world at the time in ship-building technology. China subsequently went into decline.

Arab civilization during its period of unrivalled dominance (9th to 14th centuries A.D.), when its cultural confidence was at its height, profited greatly from Greek, Persian and Chinese knowledge to develop new techniques and technologies in many fields, which in turn stimulated development in other areas. The application of new technology in surgery and in pharmacology, for example, produced such social developments like the establishment of hospitals and the special training of health personnel.

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The European Renaissance, in turn, drew heavily on Arab knowledge and achievements. Its rediscovery of classical Greek knowledge was based on latin versions of Arabic translations of the ancient Greek texts. Throughout the period of the European Dark Ages, the Arab translations were the principal repository of classical Greek knowledge. It was the teachings of Averroes (Ibn Rushd), the 12th century Moslem philosopher, based on his interpretation of Aristotle, that allowed 13th century western Christian philosophers to make the transition from religious to secular philosophy, thus giving birth to modern western philosophy. Philosophers at the universities of Paris, Bologna and Padua pioneered the teaching of "Latin Averroism", the basic tenet of which was the assertion that reason and philosophy were superior to faith, and to knowledge founded on faith.

With respect to western science, it has been said that "The Greeks systematized, generalized and theorized, but the patient ways of detailed and prolonged observation and experimental inquiry were altogether alien to the Greek temperament... What we call science arose as a result of new methods of experiment, observation and measurement, which were introduced into Europe by the Arabs... [modern] science is the most momentous contribution of the Islamic civilization...".[19] It was the Arabs, for example, who experimented with and codified the use of plants for drugs, and produced the earliest medieval manual of veterinary medecine.

Toledo and Cordoba were the two leading centres for teaching and research in science. Their recapture by christian Spain, in 1085 and 1236 respectively, gave christian Europe access to moslem scientific knowledge. Moslem dominance of mathematics and the sciences made Arabic the language of science in the late Middle Ages. Scholars who came from Northern Europe, especially to the schools of Toledo, had to learn Arabic first to enable them to share in this knowledge.

At the end of the 12th century, an Italian merchant, Leonardo Fibonacci, of Pisa, while residing in North Africa learnt of the use of the "Arabic" system of numeration which was Indian in origin and which had long been in use by Arab craftsmen and merchants. On his return to Pisa he published a book on the system *(Liber abaci)*, for technical and commercial use, which marked the beginning of the new European mathematics and which has been called the most important western contribution to mathematics since Antiquity. "By the sixteenth century the Arabic system of numeration had become almost universal in Western Europe. Its adoption was a major factor in the rise of science and was not without effect in determining the relations of science and technology in the 16th and 17th centuries".[20]

"It was largely by imitation, and, in the end by improvement of the techniques and models that had come from or through the Near East that the products of the West ultimately rose to eminence".[21] Thus the development of the relationship between Western and Middle East technology - inferiority rising to superiority, first through imitation then through improvement on models copied, and finally through original invention - paralleled the later development of the relationship between Japanese and Western technology. One of the

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several criteria currently used to assess the comparative technological achievements of countries is the number of patents for new technological processes awarded annually to their companies in the United States of America. Between 1985 and 1992 Japanese companies headed the list of U.S. patents obtained. In 1993 the top place went to a U.S. company, but Japanese companies took the second and third places.[22]

Cultural borrowings and exchanges tend to produce a dynamic effect, caused by the initial mixture of resistance to and acceptance of the foreign influence, as well as by the subsequent process of adaptation and assimilation, which inevitably results in some adjustment of the values of the recipient society. The changes in values are not merely limited to those immediately associated with the particular area of development but also influences the very way in which the society receives and transmits different types of knowledge and experiences.

An external experience, technique or model cannot be successfully assimilated by mere adoption or reproduction, it needs to be reinterpreted or reinvented in such a way that it can be absorbed through the filter of the society's cultural identity and value system. In Japan and in certain South-East Asian countries, western economic principles have been successfully re-interpreted in accordance with those countries' own systems of values and their own economic culture.

Japanese culture, like that of most South-East Asian countries, possesses a great capacity for the adaptation and assimilation of external models and experiences. Their remarkable success and, in Japan's case dominant position, achieved within the "western" economic system, without undergoing any fundamental changes in their societies' culture, social structure and values demonstrates, convincingly, that the western model of development could be utilized successfully provided that it is integrated into a country's own system of values.

Japan's system of guaranteed life-long employment, by business firms and industrial enterprises for their workers, would be a recipe for business failure in most western countries, but the practice, rooted as it is in the society's values, provided a degree of worker loyalty, solidarity and participation that would have had an undoubted influence on the level of productivity and, thus, on the international competitivity of Japanese business firms.

Japan's process of modernization, over the past century, did not come through a displacement of traditional technology. On the contrary, there was a skillful blending of new techniques with endogenous skills, and a linking of modern and traditional technologies, capitalizing on the empirical wisdom of the people accumulated over the centuries.

Japan's industrialization, in its very beginnings, was conceived, organized and managed by the State, with government funds, in the interest of the country as a whole. This was in direct contrast to the experience of western countries where industrialization was the exclusive concern of private enterprise and private capital, and organized for private profit.

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Japan's initial approach to industrialization, strange as it may have seemed to the West, was totally in keeping with its society's Confucian values by which the interests of the community (in this case represented by the State) took precedence over those of the individual.

This difference in cultural values prevented, in the case of Japan and of much of South-East Asia, the great gaps in incomes that obtained in the West, and which both reflected, and promoted, community solidarity. It also explains the *dirigiste* role played by the Japanese Government in the economic development of the country, after the first set of industries had been sold to private individuals and groups, and which is still reflected today, in the very close relations which exist between government on the one hand, and banking, industry and commerce on the other.

The determining factor in Japan's economic development was that it was an endogenous process, rooted in the socio-cultural structures of the country, which provided it with its dynamic and innovative character and ensured, at the same time, a harmonious and progressive transformation of the economy.

2.2. What causes change?

No significant development can take place without a desire for, a willingness to, or an acceptance of, change. Every culture contains, within itself, various mechanisms which either facilitate change in one direction or another or which provides obstacles to such change. There also exists in each culture a hierarchy of values which largely determines the extent of consent to change, and influences the level of acceptance of the development actions that produce such change. The relationship between development, when development implies change, and culture when it embodies values incompatible with, or hostile to, change is often, also, marked by an underlying and constant tension.

The course and pace of any technological innovation are influenced by the value attached to a new invention within the social setting in which it is contained. An innovation will normally be accepted if it appears to be useful, and rejected if it is apparently useless or dangerous, but this general rule is affected by the fact that some societies appear to be more open to change than others. Certain societies have, in their history, shown themselves to be broadly "innovating" and others broadly "conserving". In the former, technological development was more readily acceptable, while in the latter it was more willingly resisted. In the West, technological innovation has, at least for the past few hundred years, been generally considered to be desirable linked, as it was, to the idea of progress.

The history of the use, in Europe, of the fork for eating illustrates the difficulty an innovation can face in becoming accepted, even in a culture more pre-disposed than most to innovation. By the 11th century, small gilt forks were used in Byzantine society. An attempt to introduce their use in Venice, in that same century, by a Byzantine princess after her marriage to the Doge of Venice, caused a scandal. The clergy denounced it as being too

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dangerously sophisticated, and went so far as to call down the divine wrath on the princess. The fork was re-introduced to Italy from Greece more than four hundred years later, where its use was noted, at a ducal banquet in Venice in 1518, by a French silk merchant.

The fork did not come into use in Northern Europe until the 18th century, and as late as 1897 the British navy was forbidden the use of forks because they were considered unmanly and prejudicial to discipline[23]. In the United States of America the use of the fork took a different turn. American 19th century etiquette manuals were so severe in their condemnation of people who ate peas off their knives that Americans went to the other extreme in their use of the fork - a habit which still strikes visitors to that country.

The underlying dynamic of a society is, more often than not, a better indicator of the potential for change than is the capacity of that society's structures and institutions to respond to changing situations. By the time a practice or a custom becomes institutionalized, and, ipso facto, a highly visible feature of the society, such a practice or custom already represents a static element in the society, and is often to be found at the conservative end of the social continuum. Though it remains an important reference point, in becoming institutionalized, it automatically becomes an obstacle to change. Since no society, however, is completely static in terms of its values and practices, informal ways and practices, not necessarily evident to the outside observer, would have emerged, stimulated by an underlying dynamic of change, to circumvent such institutional obstacles.

What may be necessary therefore is to identify the underlying dynamic of change in a society, particularly those factors that are capable of fuelling change in such a way that it is not merely incremental, but exponential. In order to do this one would need to look at how the society has changed in the past, and in response to which types of stimuli; whether the stimuli were external or internal, whether they came from above or below, whether the changes were traumatic or easily assumed, whether they were evolutionary or revolutionary.

Such an analysis of the changes undergone in late 6th and early 7th century Japan when faced with a perceived threat from China, would have been the basis for a very accurate prediction of how Japan reacted to a similar, though more real, threat from the West in the latter half of the 19th century. The way change was brought about in both situations, was almost exactly the same despite a lapse of twelve centuries. The underlying dynamic for change had remained the same. Similar knowledge of other societies, could well be utilized in order to ascertain the most effective ways of bringing about desired change.

The stimulus for change can come from inside or from outside the society. External stimuli can be in the form of new ideas, new products, foreign pressure, foreign domination or from a perceived external threat. Internal reasons for change could be much more powerful than external ones. They could be changes in the balance of political or social forces within the society, the effect of the discovery or adoption of new techniques, new types of knowledge or the evolution of beliefs.

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An example of externally stimulated change is the radical change of direction and policies undertaken by Japan after the American Commodore Perry, at the head of a naval expedition, had forced Japan to enter into trade and diplomatic relations with the West, ending two centuries of isolation and leading to the collapse of the Shogunate and to the Meiji Restoration.

One of the most profound, peaceful transformations ever undergone by a society in a relatively brief period was internally-inspired. They were the reforms instituted by Kemal Ataturk, early this century, who declared Turkey a secular state, abandoned Shariah law and adopted a western civil code, banned the wearing of veils by women and the fez by men, and replaced Arab script with Latin script - reforms which struck at the very heart of the country's religious, social and cultural values. The objective of the changes brought about in both countries was to modernize - to transform basically traditional societies into modern ones.

The choice of development model is important, among other things, because of the fundamental changes it can bring about in a society's values. The adaptation of traditional cultural and social norms e.g. habits of saving, punctuality, discipline etc., to accommodate a particular development model chosen, can result in the formation of new cultural values which need not be based on the negation of traditional values nor on a conflict between the traditional and the modern. What is important is that the new habits be fully integrated into the society's cultural assumptions.

All successful Western societies share two cultural traits, however much they might differ in other ways. One of them is the emphasis placed on deferred gratification, since although capitalism requires people to consume it also requires that some share of the national income be set aside for further investment. The other cultural trait is the recognition of a link between individual and collective well-being. The Western development model cannot be successfully assimilated by a society without the inculcation of these two cultural traits.

Ali Mazuri, the Kenyan academic, has very eloquently described the results of the failure of Africa to integrate the western development model into its cultural assumptions, a failure by no means confined to that part of the developing world : "Africa as a whole borrowed the wrong things from the West - even the wrong components of capitalism. We borrowed the profit motive but not the entrepreneurial spirit. We borrowed the acquisitive appetites of capitalism but not the creative risk-taking. We are at home with western gadgets but are bewildered by western workshops. We wear the wrist watch but refuse to watch it for the culture of punctuality. We have learnt to parade in display, but not to drill in discipline. The West's consumption patterns have arrived but not necessarily the West's techniques of production".[24]

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3. CULTURE AND TECHNOLOGY

Technology is essentially the application of knowledge to the solution of practical problems. Those problems would vary in nature from region to region because of climate or geography or other factors governing the living environment. A recent wide-ranging analysis, by molecular geneticists, of human mitochondrial DNA[25] indicates that all Modern humans derived from a single African "Eve" - the result of a combination of genetic innovations which occurred in Africa between 140,000 and 290,000 years ago. This analysis appears to be confirmed by paleontologists on the basis of the fossil record.[26]

Anatomically Modern man, apparently, first migrated from Africa to Western and Southern Asia and, subsequently, to Europe. The cold climate of Northern Europe, which had delayed earlier migration there, would have posed an unfamiliar set of problems to which technical solutions would have had to be found e.g. warm clothing, different types of shelter, different food-gathering techniques involving the development of different tools, use of fire for heating and not only for cooking, which would have resulted in the modification of the environment by the cutting down of forests and the burning of vegetation.

It has been suggested that the challenge posed by the northern climate and fauna would have been influential in accelerating the tempo of technical innovation which, in turn, would have produced profound cultural changes.[27] The challenge would not only have stimulated technical innovation but, because an increased degree of innovation was necessary for survival, it would have been more readily inculcated into habits and attitudes, thus generating less inherent resistance to change.

Neanderthal man in Europe reached no further North than Southern Britain, Northern Germany and the Caspian Sea.[28] The first penetration of Siberia and the Arctic Circle was subsequently made by Cro-Magnons who were anatomically Modern men. The occupation of Northern Russia and Siberia, some 20,000 years ago, depended on many advances such as tailored clothes, evidence of which is attested by the discovery of eyed needles and cave paintings of parkas, as well as houses with fireplaces, and stone lamps to hold animal fat and provide light during the long Arctic nights.

Unlike Neanderthals, who rarely lived past the age of forty, some Cro-Magnon skeletons indicate survival to sixty years of age.[29] Ability to survive to an old age depended, ultimately, upon advances in culture and technology - protection of and caring for those past the age to fend for themselves, as well as improved weapons, tools and techniques for survival, defense, food-gathering, etc. In a pre-literate society elderly people are of great importance for they are repositories of information, knowledge and experience which, transmitted to succeeding generations, especially in the pre-agricultural, hunter-gatherer

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societies, enabled them to acquire knowledge already accumulated as well as to make further progress by adding to that fund of knowledge.

The first transition from a hunter-gatherer life-style to an agricultural one, which took place in the Middle East some 10,000 years ago, is one of the most important cultural landmarks in human history. There are several reasons for this important change, one of which is the ending of the last Ice Age, but it was only made possible by the development of techniques which permitted plant and animal domestication as well as tools for turning over the soil.

Archaeological evidence indicates that plant domestication in the Americas first took place about 8,700 years ago, in the area which is now modern Mexico. It appears that, in many ways, New World agriculture in ancient times was superior to that of the Old World. At the time of the first arrival of Europeans in the Americas, the Indians cultivated a wider variety of plants than were cultivated in Europe, and they used horticultural techniques that were in many cases more advanced[30]. American Indians also showed considerable skill in utilizing a great number of poisonous plants. They had developed the technology, for example, for removing the deadly poison from manioc, leaving only the edible starch.

As the first agricultural revolution spread, human life-style was changed completely to one which has since become universal except for a few surviving hunter-gatherer communities. It liberated man from having to search for food every day, since surplus food could now be stored. This not only led to the development of settled communities, but since food-growing required less time than food-hunting, it gave men more free time thus creating the possibility of leisure - a *sine qua non* for cultural creativity and an essential factor in the development of civilization.

There is a close relationship between the development of civilization and the transformation of settled communities into cities. Cities are the melting pot of ideas and invention, market places for the exchange of information and experience, as well as centres of learning. Jericho is the oldest city in the world. It is a testimony to the civilizing power of settled agriculture. Jericho was an oasis on the desert's edge, combining the availability of both wheat and water. It then attracted more people, so it had to be fortified with an encircling wall as well as a tower, ten metres in diameter, which was built in 7,000 BC and only rediscovered in the 1950s. By 6,000 BC, Jericho was a large agricultural settlement containing some 3,000 people and covering eight to ten acres within its walls.[31]

Before the internationalization of western technology, the solutions to practical problems were almost always locally inspired. It has, for example, been pointed out by Joseph Needham, the world's leading authority on the history of Chinese science and technology, that the structure of bamboo, with its transverse dividing walls, probably inspired Chinese ship design, the basic feature of which was a system of transverse bulkheads to prevent the leakage of water and the spread of fire from one section of the ship to another. This design, which is more than 4,000 years old, gave the strength and resiliency that made

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possible the construction, by the Chinese, of multi-storied ships. The system of bulkheads has since become an essential feature of all ship-building technology.

A key factor in the development of technology would be a desire for, and a belief in the possibility of, improving man's condition, which would stimulate both the search for knowledge and its application to finding solutions to the problems posed. Thus the fund of available knowledge, whether indigenous or not, is a factor in the development of technology. The acquisition of knowledge by itself, however, is not enough without a desire, or a reason, to apply it in directions which would further development.

Pre-Columbian Mayan civilization, for example, had produced astronomers of great sophistication and knowledge at a time when Europe was in the Dark Ages. Their calculation of the orbit of Venus is virtually the same as that of modern measurement, and they produced a calendar more accurate than the Gregorian one developed a thousand years later. The Mayan estimate of the length of the solar year differs from the modern calculation by only 0.0002 per cent. Unlike their Arab contemporaries, however, Mayan astronomers apparently had no desire, or reason, to apply their astronomical knowledge to finding their way beyond the horizon. Astronomy was used merely to keep correct calendars and to predict eclipses. It was not used as a guide for travellers or for navigators. Similarly, the Chinese, who were also good astronomers, applied their knowledge essentially, for astrological purposes, except for a brief period at the beginning of the Ming Dynasty (1368-1644) when several naval expeditions set out to explore the neighbouring seas and the Indian Ocean.

The astrolabe, an ancient instrument for determining direction from the stars, whose origins date back to Greek classical times, was greatly refined and perfected by the Arabs during their period of great expansion and conquest. The astrolabe was developed to be able to carry out elaborate computations that could determine latitude, sunrise, sunset, the time for prayer and the direction of Mecca for travellers. The Arab world had a greater incentive than others in the search for more accurate ways of determining direction, because Islam required that its mosques, as well as the Arab worshipers themselves in their prayers, face Mecca. Al-Zarkali (Arzachel), an 11th century Arab astronomer from Cordoba, developed an improved astrolabe and wrote a treatise on it which, when translated into Latin and Spanish, had a profound effect on the whole field of astronomy during the Middle Ages. The treatise is quoted by Copernicus in his "De Revolutionibus Orbium Celestium".[32] Arab development of the astrolabe into a much more accurate direction-finding instrument spurred, at least in part, by their religion, provided scope for more discovery and greater expansion by increasing their navigational ability.

The invention of the wheel has been regarded as a landmark discovery in the history of civilization. Pre-Columbian Mayan civilization possessed a knowledge of movement on wheels, but this knowledge was used only for making toys because of the absence of draught animals like the ox and the horse, which were the incentive in Europe and central Asia for the development of wheeled transport. The plough, which depends on draught animals was, as a result, not invented in pre-Columbian America. Similarly, in Africa, although the plough

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may have been in use in the northern part of the continent as early as the 4th millenium B.C., it was absent from large areas of the rest of the continent because of the tsetse fly whose natural prey is the domestic animal.

3.1. Technology and cultural values

A people's culture is the most essential expression of the way they see their own environment, of the way they adapt themselves to it, and of the relationship they maintain with it. Technology, which is the accumulated fund of techniques, experiences and applied knowledge by means of which a people attempts to master their environment and to solve the problems posed by their relationship with it, must be considered therefore to be one of man's most fundamental cultural attributes, which to be effective, must be in harmony with his society's own basic cultural norms and values.

Michel Leiris states: "... it is right to emphasize the capital importance of technology (i.e. the means of acting on the natural environment), not merely in the day to day life of societies but in their evolution. The chief milestones in the history of mankind are advances in technology which in turn have the widest repercussions in all other sectors of culture".[33]

Technology cannot be considered, therefore, to be culturally-neutral. All technology incorporates, and reflects, the values of the society, that society's particular creative genius, as well as the specific nature of the socio-cultural environment in which the technology is developed. This makes it difficult, therefore, for it to be transplanted successfully to a basically-different environment. Such transplantation or transfer of technology can only be successful if it can be adapted to the values and social structures of the new environment.

There is a natural interdependence between technology and culture which requires that the relationship be an essentially authentic one, since it exists to satisfy man's immediate and particular needs as well as to enable him to live in harmony with his very own environment. Indeed, tools are the interface between man and nature. The development of new technologies is linked to a society's evolving needs, to the relative importance accorded to satisfying them, and to the application of new and different solutions to existing practical problems based on the society's creative capacity and its particular knowledge and experiences. The introduction of a new technology often creates new social situations which, in turn, create new needs and values, thus stimulating further technological development.

This very close relationship between a particular culture and the technology developed by it, is demonstrated by the fact that different societies, throughout history, have arrived at different solutions for similar problems which they faced. At a period during the Roman Empire, Rome ran out of precious metal for coins. The Roman writer, Pliny the Elder, had complained as early as the 1st century A.D. of the Empire being drained of precious metal for the purchase of spices and precious stones from the East. This drain of gold and silver was so great that Rome was subsequently reduced, temporarily, to a barter economy. When

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China, in the 8th century A.D., was faced with a similar problem, largely because of an expanding economy and of the export of precious metal to pay for increased imports of ivory, pearls and rhinoceros horn, it introduced the use of paper money. Subsequently, in order to combat counterfeiting, silk was mixed with the paper used for bank notes, thus combining two major local technological achievements - the manufacture of paper and of silk. In Europe, the first recorded use of paper money was nine centuries later - an issue in Sweden in 1648.

The English philosopher, Francis Bacon (1561-1626) selected three inventions - paper and printing, gunpowder, and the magnetic compass which had done more, he thought, than any religious conviction, or any astrological influence, or any conqueror's achievements, to transform completely the modern world and mark it off from Antiquity and the Middle Ages. He considered the origins of these inventions to be "obscure" and died without knowing that they were all Chinese.[34]

The example of one of those three inventions - paper and printing, which are, in effect, two distinct but closely associated inventions - taken throughout history, illustrates perfectly the symbiotic relationship between technology and culture. Paper was first produced by the Chinese, in the early part of the 2nd century A.D., from the bark of the mulberry tree. Marco Polo, who visited China in the 13th century, commented, with amazement at the use of paper money, instead of precious metal, as currency. He did not find it sufficiently significant, however, to report on the reproduction of sacred texts by wood-block printing which had developed during the T'ang Dynasty (618-907 A.D.). Apart from the 130 volumes of the Confucian classics, 13,000 pages of the Buddhist canon had been printed in this way by the latter half of the 10th century A.D.[35]

Block printing made possible the flowering of Chinese culture during the Sung Dynasty (960-1127 A.D.), and the printed Confucian classics revived a Confucian literature. The Koreans, who had printed with blocks, in the Chinese manner, since the 8th century were deficient in the hard, close-grained woods best suited for printing blocks, which they had to import from China. The increased demand for books, stimulated by wood-block printing, required increased imports of wood from China. The Koreans therefore decided to substitute metal, instead, for block printing, and metal type printing became standard in the 13th century.

The Koreans then experimented with moveable metal type (50 years before Gutenberg) as the Chinese had done in the 11th century but using ceramics instead. The Korean language, like Chinese, had no alphabet, which meant that more than 30,000 type characters were needed. Korea which used Chinese ideographic characters, found block printing, therefore, more advantageous and more practical than moveable type. The Roman alphabet, on the other hand, with its small number of different characters, made it possible and practical, to use interchangeable type which was the crucial factor in the establishment

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of the power of the printing press in western civilization. The cultural differences between Europe and China, as exemplified by the Roman alphabet and the Chinese ideograph, had a determining influence, therefore, on the development and use of printing technology.

Paper-making technology reached Europe via the Arabs. "Seek knowledge even in China"[36] the Prophet had advised, and it was through Chinese prisoners captured by the Moslem Governor of Samarkand in Central Asia in 751 that the Arabs acquired knowledge of how paper was made in China. By the end of the 8th century, after introducing refinements in the paper-making process, the Arabs had built the first paper factory in Baghdad. This development stimulated a flourishing literature in Arabic, and produced important works on poetry, history, medicine, astronomy and mathematics. Communication was facilitated by the development of a type of paper light enough to be carried by pigeons. Arab paper-making technology subsequently reached Italy, France and Germany in the 14th century from Moslem Spain.

Gutenberg developed, in 1434, the first printing press in Europe using moveable metal type technology, and by 1491, 236 European towns possessed printing presses. The printed press ushered in the printed book in Europe, which not only made knowledge more accessible, because books became cheaper, thus laying the basis for the scientific revolution, but it also helped to develop national languages, standardizing them by the elimination of many dialects (thus Francien, spoken in the Paris region, became the French national language) and led to the development of national literatures, which tapped new sources of creativity. Furthermore, the development of national languages helped promote national consciousness - the essential element in the construction of the nation state - which proved to be the death knell of Latin Christendom.

The Catholic Church, in giving its moral support to the use of the new printing technology, erred in its appreciation of its possible effect. The Church had expected that the printing press would facilitate the propagation of its own version of the scriptures, thus strengthening its position. Instead, by making possible the easy circulation of philosophical writings, the printed book promoted criticism of religion thus paving the way for the theological challenge to the Catholic Church. Printing thus became the instrument of the laity against the clergy, of the vernacular languages against latin and of science against religion.

Martin Luther established the norm for modern standard German by choosing the High German dialect, used by the Chancery of the Duchies of Saxony, in which to translate the Bible from Latin. It has been estimated that before Gutenberg, manuscript books in Europe could be numbered in the thousands. By 1500 A.D. at least ten million printed books were estimated to be in circulation in Europe. Book printing produced a great increase in literacy, and made possible the development of a mass reading public which, in turn, facilitated the emergence of new literary genres such as the novel.

The use of reading glasses, whose appearance in Europe date from about 1285 when Italian glassworkers discovered that glass with a convex surface corrected longsightedness

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in older people, became common towards the middle of the 15th century. Coinciding with the development of the printing press, the availability of reading glasses helped to accelerate the spread of the habit of reading and the resultant, general increase in knowledge.[37]

Printing, also, not only gave impetus to the growth and accumulation of knowledge, but by facilitating the spread of ideas (e.g. those contained in the Declaration of the Rights of Man, and in the works of the 17th and 18th century philosophers) it helped to bring about profound changes in social and political relations. Thomas Carlyle, the influential English writer and historian, remarked in 1836, less than three centuries after Gutenberg's bible, on the profound and far-reaching effect of printing: "He who first shortened the labour of copyists by the device of moveable types, was disbanding hired armies, and cashiering most kings and senates, and creating a whole new democratic world".[38]

Although the Bible, before the era of printing, had been copied laboriously by hand by clerics in monasteries, the art of the hand-written word never took on the importance it did with Islam. There were therefore no religious, psychological or aesthetic hurdles to overcome in printing the Bible. Also, the Bible was written over a period of several centuries, and compiled by various prophets in different places (parts of the Bible were written during the Babylonian Exile in the sixth century BC). This has resulted in differences of opinion on the authenticity of particular versions, which has given rise to a separate branch of biblical studies - Hermeneutics, the study of the general principles of biblical interpretation. The Dead Sea Scrolls, discovered in the Judean desert between 1947-1956, reveal the co-existence of several different biblical texts before the emergence of a unified text at the end of the 1st century A.D.

The Koran, on the other hand, represented the word of God as revealed to the Prophet and was written in Arabic script exactly as it was revealed. The words of the Koran could, therefore neither be changed nor re-interpreted. They were the Truth. Islam believed that the text of the Koran could not be properly translated, and should be transmitted only in the original hand-written format used by the Prophet's disciples. Indeed, it has been said that the Koran loses, in translation, the effect of the inspiring beauty of its language which is claimed to have been an important factor in conversions to Islam in the early period.[39] Furthermore, as its name suggests, the Koran (Qur'an: Recitation) is meant to be recited aloud, and the sound of its language is said to be an essential element of its effect on those who hear it recited. The Arabic script subsequently assumed almost an iconographic importance, and calligraphy became one of the most important of the Islamic arts, hence the rejection of printing, for centuries, both on religious and on aesthetic grounds.

For purely cultural reasons, therefore, the development of printing took a very different course in Islamic civilization than it did in Western Europe, with very different consequences. The use of printing both for the Koran and for other Islamic books was forbidden. The first printing press in the Moslem world was established in Turkey, but operated only between 1727 and 1745. It was not permitted, however, to print the Koran or books on theology, or law, and confined itself to works on mathematics, science and

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translations from western languages. Books were not printed again in Turkey until the Reform movement during the period 1836-1876. In Egypt, printing was not permitted until the early 19th century. Thus Arab and Islamic civilization missed out on the advances made in Europe through the introduction of printing technology, the effects of which were so far-reaching that they virtually laid the foundation for the modern European state.

The interdependence between technology and culture can also be illustrated by the history of the foot stirrup which was first developed by the Chinese, in the 3rd century A.D., from the Indian toe stirrup invented in the previous century, but reached Europe much later when it was used by the Franks in the 8th century, giving them a decided advantage over their mounted adversaries. Before the invention of the stirrup, which gave greater stability to the horseman, the latter had to hold the horse's mane tightly to avoid falling off. The introduction of the stirrup not only made the mounted warrior supreme in medieval warfare but initiated complex and far-reaching social and cultural changes in Europe.

The stirrup, which made mounted shock combat possible, has been described as one of the most significant inventions in the history of warfare, prior to gunpowder. Charles Martel, the Frankish king who united the entire Frankish kingdom under his rule, recognizing the military potentialities of the stirrup, seized large areas of church lands which he distributed to his retainers on condition that they serve him by fighting in the new manner. Thus was Feudalism born and subsequently spread, with the Frankish conquests, into Northern Italy, Spain, Germany and later into the Slavic territories. The Normans took Feudalism to England with their conquest and, later on, to Southern Italy and to Sicily.

The mounted knight was at the centre of the European institution of chivalry, the origin of which owed much to the influence of the tradition of courtly love and to the idolization of the female subjects of such courtly love, that Christian knights had encountered in the Arab lands during the Crusades. "The Ring of the Dove", an early 11th century treatise on courtly love by Ibm Hazm, an Arab poet-philosopher from Cordoba, was subsequently translated many times into several western languages. The development of the knight's "uniform" of chain-mail and plate which, together with jousting tournaments, were the features of the age of chivalry to become best-known to later generations, would not have been possible without the stirrup. The knight would not have been able to mount his horse without it, and if he had succeeded in doing so he would not, with his elaborate and heavy dress, have been able to retain his seat on the horse.

The end of the political and military usefulness of the chivalrous knight, led to the establishment, in 14th century England and Burgundy, of the first Orders of Knighthood, which laid the foundation for the institution of the aristocracy - a system of privilege, based on social class, which has had a profound influence on European social and political development.

Architecture, the development of which, throughout history, has been stimulated by both technical and cultural considerations, has seen technical developments give rise to new

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artistic possibilities, and developments caused by cultural changes produce new building techniques. Romanesque and Gothic architecture that produced the outstanding aesthetic contribution of the Middle Ages, embodied significant technological innovations.

Architects of the Gothic cathedral, which has been called "a stone bridge to heaven", sought to build ever taller cathedrals. To do this they developed the cross-rib vault and the flying buttress, which not only made it possible to build higher, but allowed more of the weight of the ceiling to be taken off the walls. With the walls no longer needing to be built as solidly as before, a much wider expanse could then be used for windows, which provided scope for the new craft of the glazier, using coloured glass with striking effect in the huge stained-glass windows.

The monumental Gothic cathedral with its great mass and its high ceiling inspired awe, in which hope of salvation was mixed with fear of damnation. The introduction of the Virgin Mary, around the 12th century, into the Catholic pantheon, heralded a change in the attitude of the Church. The emphasis shifted from fear of the wrath of God and of damnation to love and hope of redemption - the latter qualities personified by the Virgin Mother.

This change called for a new type of church architecture which is exemplified by the Pazzi Chapel, built in Rome in 1430, in a style that has been called the architecture of humanism. Renaissance architecture, adjusted to the scale of human need, reflected the newly-acknowledged dignity of man and his humanity. This new architecture also incorporated new techniques in its use of perspective and spatial harmony.

Another example of the interconnection of culture and technology is that represented by the dependence of mathematical and scientific development on the existence of a written language. Ali Mazuri has pointed out that the lack of written languages hindered the development of mathematics in Africa. Addition and simple multiplication could be done orally, but division and the development of other aspects of mathematics needed a written formulation. The development of mathematics, hindered by the lack of a written numeral, adversely affected African scientific development in general.

The course of modern European scientific and technological development was influenced by religious considerations. When Galileo was put under house arrest in Rome because his views on the motion of the Solar system went counter to Catholic doctrine, the center of European scientific activity shifted from Italy to Northern Europe, and the microscopic applications of Galileo's work with the telescope were made in the Netherlands not in Italy. It was a Dutchman, Anton van Leeuwenhoek, who discovered bacteria and spermatozoa. Galileo himself foresaw this development during his long drawn-out battle with the Inquisition and the Vatican. In the opening pages of his book "Dialogue on the World Great Systems" published in 1630, and which earned him his condemnation, he had written that Italian science was in danger of being overtaken by Northern rivals. Descartes, Galileo's most famous contemporary, decided, after the latter's condemnation, to remain in the Netherlands out of reach of the long arm of the Inquisition.

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Finally, in the United States of America, it is most likely that cultural factors helped stimulate the development of dental technology, giving the latter a degree of importance enjoyed in no other country. The United States is, probably, the only country where happiness is enshrined as a constitutional right, with the stipulation that every citizen has an inherent right to "Life, liberty and the pursuit of happiness". Happiness having become a political right, it was not long before it became *de rigueur* in art as well as in life. Until quite recently, American novels and films had to have happy endings if they were to achieve success with the public, while a dazzling smile became a badge of happiness which most public figures felt they had to wear constantly if they, too, were to achieve success. A dazzling smile requires perfect teeth and, here, dental technology came to the rescue. It is no coincidence, therefore, that the United States leads the world in dental technology as well as in the level of dental care of its citizens.

3.2. Origins of Modern Technology

Ancient technology developed slowly, on a practical basis, by the observation of cause and effect. Ancient (and traditional) technology are based on the accumulation of practical knowledge without any theoretical basis. Thus, effects were produced without being able to be explained. Since inventions were not systematic, chance played an important part in determining the pace of technological development.

The marriage of modern science to production gave birth to modern technology which naturally assumed the characteristics, cultural and otherwise, of the societies which produced it. With modern technology, the pace of technological evolution accelerated, becoming more systematic and more controlled. The relationship between technology and science became more profound as the nature of the relationship changed. At the beginning, scientific theories followed technological innovation and development, as was the case with the steam engine. Subsequently, theory began to precede technological achievements as in the case of atomic energy. This changed relationship helped to accelerate technological development by making it more systematic and more predictable. The predominant characteristic of modern technology, therefore, is its close interaction with science.[40]

Modern technology represents, in effect, a systematic approach to the solution of the various problems posed by production. It therefore also has a close relationship with modern industry which has inevitably influenced the nature of its development. The gap between developed and developing countries is basically one of know-how, and know-how is essentially about technology and skills which, in turn, affect production and which, in its turn, is based on consumption patterns and stimulated by demand. There is therefore a constant interaction between consumption, demand and production, trends in taste affecting demand and thereby production which, by its increasing efficiency, creates new trends by making different consumer products cheaper and more accessible.

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The development of the consumer society in the industrial West required a regular increase of the quantity of available goods and services and, at the same time, an increase in labour productivity, in order to render those goods and services ever more competitive. Modern technology was enlisted by modern industry in this effort which, combined with a highly-developed division of labour, made possible large scale production of goods in a way that permitted both great diversification and a high amount of standardization. Modern technology's role in the constant perfectioning of industry's tools, materials and processes, through technological innovation, has probably made scientific knowledge, which is the basis of all modern technology, the decisive factor in development - a role which capital and labour had hitherto played.

Modernization has a homogenizing effect because, by diffusing the same basic technological procedures, it stimulates institutional and structural responses which are similar to those experienced by the West. Industrial/technological civilization has been confused with Western civilization because it was in Europe that a combination of particular circumstances first produced an industrial revolution which could well have occurred, spontaneously, elsewhere had it not done so in Europe.

> As Claude Lévi-Strauss puts it "..... the simultaneity of the same technological upheavals (closely followed by social upheavals) over such enormous stretches of territory, so remote from one another, is a clear indication that they resulted not from the genius of a given race or culture but from conditions so generally operative that they are beyond the conscious sphere of man's thought. We can therefore be sure that, if the industrial revolution had not begun in North-Western Europe, it would have come about at some other time in a different part of the world".[41]

Just as the development of agriculture had led, spontaneously, to settled communities, trade, specialized occupations, etc., both in the Middle East and in North/Central America, independently of each other, industrial civilization, if it had first occurred elsewhere than in Europe, would probably have had essentially the same characteristics. This would have been so because of the conforming influence of the necessary harnessing of energy sources such as steam, coal and oil which were essential to industrialization. Many of the structural consequences of an industrial economy would, inevitably, have been similar wherever it first occurred - the rise of a proletariat, for example, or the opportunities provided for the development of group action by the coming together of large numbers of factory workers, which led to the establishment of trade unions with important social, political and economic consequences.

The fact that the industrial/technological revolution first occurred in Europe not only gave that region an invaluable headstart which allowed it to dominate the world for a century and a half (superior military weaponry being an important byproduct of the industrial

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revolution), but also led to Western values and traditions, as well as their particular forms of social and political organization, being regarded as indissociable from the modernization process.

The low cost of labour has traditionally been the principal advantage enjoyed by developing countries in attracting the establishment of foreign manufacturing and processing enterprises. However, the increasingly important role played by technology, in production, is rapidly eroding this advantage, especially in those countries where technological skills and infrastructure remain largely undeveloped.

Modern technology is not only not culturally-neutral in the sense that it is the product of a particular socio-cultural and economic system, and was developed to meet that system's particular needs, but also in the sense that it has particular socio-cultural implications. The increasing mechanization and automation of the productive processes in the industrialized societies, for example, result in increased productivity per worker, thus reducing the labour needs of industry and creating surplus labour.

The ever increasing content of higher technology in industry's productive processes, requires constant up-grading of the type of worker skills needed, which renders a rapidly increasing number of underskilled workers unemployable. Furthermore, education systems, not yet having adjusted to the changed situation, continue to turn out large numbers of young people whose level of skills ill adapts them to the changing needs of the economy. The economic and social consequences of having an increasing proportion of youth, in the industrialized societies, with diminishing prospects of gainful employment, have called in question the western development model based on the relentless pursuit of increased productivity, competitivity and profits.

3.3. Technology Transfer

The fundamental question posed by the transfer of technology is that of choice - what type of technology is best suited to the particular needs of the country concerned. Equally important, though subsidiary, questions because they depend on the choice of technology, are whether the technology can be adapted to the specific circumstances of the society, and whether the latter possesses the capacity to master it.

Modern technology, as has been shown earlier, is closely linked to the industrial model of development, developed to suit the needs and circumstances of the industrialized countries. After Independence, the developing countries, when importing technology in an effort to stimulate economic growth and development, did not have a choice between capital-intensive and labour-intensive technology. They had to import the former though the latter would have better suited their circumstances.

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Apart from the extra economic burden the use of such capital-intensive technology placed on developed countries which did not have large domestic capital resources, there was a great deal of social dislocation caused by the growing gap which often developed between the static, rural economy and the more dynamic urban-based economy where the new industries were situated. The application, in countries with basically rural economies, of the essentially urban, western industrial model and the technology which went with it, also resulted in a degree of urban migration which caused serious social consequences.

The transfer of technology from the industrialized countries to developing ones has not, generally, had the desired results for various reasons. There is a widespread misconception, in developing countries concerning the nature of modern technology, and an underestimation of the difficulty of successfully transplanting it into a socio-cultural environment different from that in which it was developed. As a result, insufficient effort has been made by the recipient countries to adapt the imported technology to their specific needs and circumstances.

There is also the widespread feeling that modern technology can be bought off the shelf and merely "plugged in", like a television set with only the need, perhaps, to slightly adjust its aerial. Modern technology is, however, a cultural product - a product of a particular type of culture and society which needs to be assimilated like any other foreign cultural product. Any modern technological process is the end product of a series of developments assimilated by the workforce and social groups, in its various stages, and inculcated into their working and living habits. The history of technological development indicates that it is difficult for a social group or workforce to assimilate a new technique without having assimilated, or mastered, the older technology on which the new one was based. The development of indigenous technologies would not only facilitate their assimilation by the local population but also, by promoting the growth of a technological culture, it would at the same time address the problem, faced in many developing countries, of adequately servicing those foreign technologies which need to be imported.

Abdus Salam, Nobel Prize winner, and Director of the International Centre for Theoretical Physics in Trieste, has often pointed out the mistake of developing countries trying to buy technology while neglecting to invest in the basic sciences. He emphasizes that technology follows science and that if a country is not good at science it would never be good at technology. His advice to developing countries is that economic prosperity today lies with areas of science-based high technology, and that the major investment needed in these areas is investment in creating scientifically highly-literate manpower. "For long-term effectiveness, technology transfers must always be accompanied by science transfers,..... the science of today is the technology of tomorrow".[42]

Investment in the basic sciences, in scientific manpower and in scientific research is not enough, however, unless it is accompanied by deliberate efforts to exploit their technological potential. At the end of the 18th century, there was probably a greater concentration of famous scientists in Paris than in any other city in the world. France's early

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scientific success was based on the advanced state of mathematics teaching in the country, but the faculties of science remained, essentially, teacher-training establishments. French scientists accorded more importance to mathematical research than to research directed to industrial ends whereas, in Germany, industry influenced scientific research towards technological applications. France which, in 1930, was still the second largest exporter of patents in the world (after the United States of America), was overtaken by 1938, in this respect, by both Germany and Britain.[43]

A failure on the part of most developing countries, to understand the link between national scientific capacity and the implantation of foreign technology has led to the conviction that there was no need to duplicate the efforts of the industrialized countries in making major investments in scientific research and development, since technology could be bought whenever it was needed. In this respect, the UNDP Human Development Report for 1992 has noted that whereas the percentage of the GNP of the industrialized countries allocated to scientific research and development is increasing, that of the developing countries is decreasing.

Hence insufficient effort is made by most developing countries to formulate relevant and coherent science and technology policies, to develop scientific education, to promote a scientific culture, or to help create the conditions for the development of endogenous technology. The relative lack of importance accorded to science and technology in development strategies is reflected in the fact that in most developing countries there is no Government ministry whose primary responsibility is science and technology.

The reluctance of industrialized countries to transfer to developing countries patented knowledge of technological processes is certainly a factor which has contributed to the lack of success in technology transfer. However, the pace of technological change is such, and the technological cycles of industrial products are becoming shorter and shorter at such an accelerating rate, that the mere acquisition of a technological process by a developing country would not be sufficient to endow that country with a competitive technological capacity in that area if it does not possess the infrastructure and the innovative capacity to keep up with developments in the particular field. Microchip technology, for example, has developed so quickly, that the process, if it had been acquired by a developing country at any time within the past two decades, would have become obsolete within a very short time.

Finally, little effort has been made by developing countries to learn from the experience of other developing countries in their efforts at transplanting western technology, and thus profit from their successes and failures. The persistent belief, also, that modern technology is a western monopoly has prevented many developing countries from seeking technology adapted, or developed, by the more industrialized of the developing countries which would, almost certainly, have been cheaper and which might have been more suitable to the needs and circumstances of the former.

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4. THE DEVELOPMENT CHALLENGE

Walter Rodney, the Guyanese academic, has produced one of the best, succinct descriptions of the development process:

> "A society develops economically as its members increase jointly their capacity for dealing with the environment. This capacity for dealing with the environment is dependent on the extent to which they understand the laws of nature (science), on the extent to which they put that understanding into practice by devising tools (technology), and in the manner in which work is organized".[44]

Economic development is based largely on the efficient production and distribution of goods and services which, in turn, depend on the effective application of technology to the solution of problems posed in ensuring such efficiency. Developing countries cannot, therefore, escape the need to develop and master the technologies required for their own economic development if they wish to exercise control over, and determine the direction of, such development.

There are several other factors which are important to the development equation - choice of type of development, choice of technologies to import, adapt or create; choice of education system, including its content; choice of modes of production and forms of organization, all of which should have a high cultural value content. For example, the Japanese life-long employment practice was much more effective in that society than the western "hire and fire" method would have been.

There are several lessons to be drawn from the Japanese experience that can be instructive to developing countries and perhaps more so than those from the West, since Japanese modernization began with a form of state capitalism that is closer to the way economies are managed in most developing countries than is the western private, free enterprise model:

a) The most competent people were chosen for Government jobs, on a rigorously selective basis;

b) A deliberate decision on the part of the post-Meiji Restoration Government to identify what was best in each field of knowledge and technology, find out where it existed, and seek it out;

c) A deliberate decision that the techniques and models imported from the West would be "Japanized";

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d) Instead of attempting to modernize all sectors of the economy at the same time, a certain number of key sectors were chosen on which attention was concentrated in terms of investment and training. When performance in these sectors reached a high level, they acted as a motor which pulled the whole economy along with it, thus benefiting the other sectors;

e) A deliberate education policy with clear objectives, based on compulsory basic education for all, and an emphasis on scientific and technological education at the tertiary level. The introduction of a system of universal education began in 1871. In 1873 only 28% of the school age population attended school, and by 1904 the percentage of school attendance had reached 98%.[45] 90% of the first batch of students to graduate from Tokyo University in 1880 obtained diplomas in Physics or in Chemistry.

4.1. Education in Development

Whereas culture is the key which unlocks the creative potential of a community or society, education is the tool which could shape and guide the development of that potential, while at the same time, channelling it in directions which respond to the community's own aspirations. There is a constant interaction between education and culture - if it is the former that sheds light it is the latter that provides perspective. Education is infused by culture, but since cultural models and meaning are mainly transmitted through education, the former could be considered, in a sense, to be an effect of education. Education could, therefore, be regarded as being, possibly, the most powerful agent for cultural development or change, and not merely a neutral mechanism for cultural transmission. Literacy, for example, is the most important means of preserving and transferring experience. Those cultures, therefore, which had not developed their own literacy skills found themselves with a reduced capacity for change and an increased vulnerability to foreign cultural penetration and influence.

How can education contribute to cultural development which can quite justifiably be regarded as the leaven which ensures the development of a society by giving it the capacity for self-expression and self-reform? One method would be to develop educational techniques for creating situations within a community or a society in which the level of people's consciousness could be raised, and their awareness of their own potential increased. The recognition by a community of the potential of its own resources is a prerequisite for building on those very resources, which is the essence of endogenous development.

Education, in broadening an individual's mental horizons and in creating an awareness of the possibilities offered by increased knowledge of the world around him, arouses expectations that could only be satisfied in ways which are in harmony with his, and his own society's, cultural universe. If education systems are ill-adapted to the real situations, aspirations and needs of the communities they serve, the values transmitted would not be those with which the community as a whole could identify, and which could provide the

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inspiration for it to mobilize its collective will, energy and originality, thus enabling it to pursue the continuous process of its own development.

In many developing countries, traditional forms of education were not allowed to evolve into an integrated modern system by the gradual incorporation of foreign techniques and content. Modern education in these countries was, more often than not, a foreign implantation that ignored traditional knowledge and values, and frequently instilled negative attitudes towards them. Thus generations of students in the colonial era, and in the immediate post-independence period, grew up learning more about the history of the "mother" country than of their own, and what they did learn of their own history was often coloured to reflect the views of the colonial power, and the latter's own perception of its role in that history.

During the colonial era, those aspects of the education systems of the metropolitan countries, which were transplanted to the colonies, were not adapted to suit the circumstances of the latter. This practice produced such cultural aberrations as "Nos ancètres les Gaullois" (our ancestors the Gauls) taught to children in French colonies, and also the over-emphasis on classical Greek and Latin studies in the British colonial system, based on the assumption that the values of those two civilizations were universally valid and applicable.

As early as 1881, Edward W. Blyden, a descendant of African slaves born in the Danish West Indies who had become the President of Liberia College in Monrovia, deplored, in his inaugural address as President of the College, the estrangement from African tradition and the self-deprecation caused by European education. He urged the students of the College to go into the interior of the country to draw inspiration from their own roots.[46]

The contrast with the situation in Japan, which was beginning to develop its own system of public education during the very same period, is most instructive. The Imperial Edict on Education, issued on 30 October 1890, states: "Our imperial ancestors founded Our Empire on a broad and lasting basis in which virtue was deeply and firmly implanted; Our subjects, united as ever in their loyalty and in their filial devotion have, from generation to generation, given proof of the magnificent quality of these founding principles. Therein lies the glory and the essential nature of Our Empire, and therein, also, lies the inspiration and the source of Our education".[47]

The education systems, introduced in colonial times, were intended, essentially, for the needs of a static society, and for the training of people who would fill teaching or clerical and junior administrative jobs, not the managerial jobs that a dynamic, productive society would require. There was therefore more emphasis placed on a literary type of education, and little or no effort to produce people with technical, or numerical skills. This practice has bequeathed an unfortunate legacy, the effects of which are still very evident in the vast majority of developing countries where greater importance is still placed on administrative (as distinct from managerial) skills than on technical capacity. To gain promotion above a certain level, technically-qualified professional staff still need to move to administrative jobs. This legacy has proved a major handicap to the development of most Third World countries -

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a handicap which many developing countries are trying to overcome. The effort put into overcoming the handicap of a basically literary education system varies, however, from country to country, depending on the importance accorded to education in general and to scientific and technological education in particular, in the development strategy of the country.

An important aspect of the quality of education is its relevance - it should form part of an overall development strategy taking account of the needs and expectations of the population, and basing its objectives and content on the social, economic and cultural environment. The way in which education trains people for work is a criterion of its relevance. Accelerating technological progress leads to a rapid obsolescence of skills, and this underlines the importance of technological adaptability. Teaching people to learn, therefore, is more important than imparting specific knowledge which may soon become obsolete.

Education's role in instilling the habits, attitudes, practices, techniques and knowledge required for productive development is a key one. It also plays an important role in the promotion of a technological culture and in the development of innovative potential. Adaptation of education to the needs of a productive society implies the development of a basic technological education which should be accompanied by a willingness, on the part of the society, to integrate into its culture, its habits and its economic practices those measures required for technological progress.

Any examination of the sociocultural factors influencing the development of a technological culture in most developing countries would highlight the low value placed on arts and crafts and, as a result, on technical and vocational education, which need to be given increased importance in the value systems of developing countries. The men who made the Industrial Revolution in Britain were the craftsmen - millwrights, watchmakers, canal builders and blacksmiths. The inventions and innovations of these craftsmen (the use of iron for ship construction, the steam locomotive for rail transport, the use of steam for powering factory machines, canal design for transportation of industrial goods, etc.), spurred and encouraged by a system that did not accord an inferior status to their work, gave Britain a headstart in the Industrial Revolution which ensured her economic dominance for at least a hundred years.

Scientific and technological education can play an important role in developing analytical and synthetic skills, in encouraging the exercise of critical judgement and in stimulating the development of observational and creative potential. Technology should be introduced into general education at an early stage, not only because it could provide an important introduction to vocational training, but because it represents an inescapable part of everyday life. A basic knowledge of it is, therefore, essential for understanding and interacting with one's environment. A scientific and technological component, based on observation and experiment, and linked with real-life situations - in health, for example, or in nutrition or environmental protection, could be introduced into the primary school

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curricula. Indeed, the educational system should, from the very beginning of primary schooling, provide the tools for a scientific understanding of the world that the child sees around him.

Such developments would only be able to fulfill their real potential if they are accompanied, or preceded, by fundamental changes in curricula - such as the development and restructuring of the teaching of mathematics (which has quite rightly been described as the language of science), the integration of science teaching into general education, and the association of the latter with the solving of local problems. But it is equally important to bring about improvements in teaching methods - more creativity in teaching, the rewarding of innovation in class, the encouragement of a critical attitude on the part of the student, and the placing of emphasis on "learning to learn".

The incorporation of such efforts and practices into a society's cultural assumptions would facilitate the forging of stronger links between its educational and its productive processes. This could lead to the creation, development and adaptation of endogenous technologies that could be used as grafting points for the introduction and assimilation of technologies from abroad. Academic research, oriented to local subjects from its simple, primary school origins, would more easily direct its focus to the real developmental needs of the country. The local business community would also be more encouraged to provide funding for basic scientific research in fields likely to produce results of relevance to local industry.

The term human development itself implies that such development should not take place at the expense of human rights. Respect for the rights of others as well as their right to be different is best promoted through education. No degree of civilization, however advanced, is a guarantee of tolerance, in times of crisis, towards those who are seen as being different, or a defense against the violation of accepted norms of civilized behaviour. Negative stereotypes of members of minority groups lurk and fester in the social subconscious and, in difficult situations, come easily to the surface, providing grist to the mill of political extremists. Recent events in certain parts of Europe could very well be repeated in any multi-ethnic society through a chance combination of exceptional circumstances.

It is only education, begun preferably from early childhood, that could eventually provide an ethical dimension to the general conduct of the majority group in a community towards individuals or minority groups perceived as being different. In doing so, education could erect bulwarks against the sort of primal behaviour that majority groups are tempted to engage in during periods of national hysteria caused by deep social crisis.

Children have a natural capacity for compassion, an instinctive and often acute sense of what is just, as well as an ability to overlook differences between themselves and other children - qualities which society teaches them to control and even to ignore and discard as they grow older. Education, intervening at an early stage in the child's schooling, could

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reinforce these natural tendencies, thus providing an anchor to which the latter can be moored in the sea of social prejudices that children find themselves in as they struggle to define both themselves and their relations with the adult world.

Education for intercultural understanding should also be directed towards youth in order to strengthen their natural capacity for building cultural bridges. Young people tend to be more mobile, more open in their attitudes, and more exposed to opportunities for intercultural relations. The cultural barriers of youth anywhere are more permeable. They, more than any other segment of society, are capable of showing that instinctive understanding for, and appreciation of, aspects of cultures not their own. There is the example of music, certain forms of which reach successfully across national, linguistic, racial and cultural barriers to strike similar chords in youth everywhere, when older generations often remain uncomprehending and unmoved by the same music.

Finally, societies, like individuals, possess a reservoir of ideals which give them inspiration and to which they attempt, though not always successfully, to adhere. It is, however, when they succeed in living up to those ideals, and in translating them into practice, that societies and invidividuals are able to rise superior to narrow self-interest and prejudice, demonstrating the qualities of the human spirit at its best. One of the tasks education should set itself is that of restoring the development of the qualities of the human spirit as one of its primary goals.

4.2 Art and Creativity in Development

Countries possessing artistic traditions that could lend themselves to industrial applications, like industrial design for example, should provide encouragement and facilities in that direction. Industrial design is applied to virtually all objects of modern life, the quality of design, both with regard to its aesthetic appeal and to its practical aspect, is recognized as a key factor in determining consumer choice. Furthermore, most industrial design needs no heavy investment in installation facilities, no advanced technology, no massive amount of capital - all of which have been constraints to Third World economic development. An article could be designed in one part of the world for manufacture in another, and destined for a market in yet another part of the world.

The creative talent, imagination and flair for design, for example, shown in their carnival creations by certain countries like Brazil, Trinidad and Tobago, and others in the Caribbean, which go much further than mere costume design, could certainly be applied, with effective results, to industrial design. The establishment of facilities such as schools of design or courses in industrial design in existing institutions could go far in tapping such reservoirs of creative talent, and channelling it in directions that could stimulate development.

The promotion of the creativity of individuals is necessary for the fostering of their ability to discover, invent or re-invent forms of expression that are in keeping with their

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society's own cultural universe. The creative artist often plays the important role of both articulator of a society's shared beliefs and values and stimulator of its collective imagination. In this respect, the artist plays an invaluable role in the transformation of a society - a role that has always been readily accorded to education, but one in which the artistic contribution has often, largely, gone unrecognized.

The artist, and those who create, carry in them forms of expression and vision which make them both the vector of cultural values as well as the inspirers of new values which, in turn, serve to point to the direction in which the future of their society lies. Artistic creation, therefore, more than any other human activity, is inseparable from the civilization which nurtures it and whose very essence it expresses.

Education can play a very important role in helping to establish the conditions which favour artistic creation. Any policy towards this end should first be directed towards children, not only because cultural development, at the individual level, is most effective when begun in childhood, but because most children possess an unspoilt sensitivity, a power of imagination and a creative sense that, more often than not, are lost or blunted in the process of growing up.

Throughout history, the built environment has been one of the principal forms of cultural expression, reflecting at the same time a people's technical solutions to the problem of shelter as well as their own artistic sensitivities, aesthetic values and religious beliefs. Thus a people's architecture not only differed, obviously, because of different climatic conditions, but also in similar climatic conditions. A striking example of this are the places of religious worship -churches, mosques, temples, cathedrals, etc.

Architecture which, as a communal art, expresses more than any other art form the cultural values of a community has, historically, been one of the main outlets for a community's creative energy. The importation by developing countries, therefore, of standardized architectural models, quite often unsuitable to their climate, has often proved expensive and impractical but, more importantly, by stifling local architectural creativity, deprives local communities not only of a major outlet for cultural expression and creative energy but also of a permanent opportunity to utilize their natural genius for developing their own technical and locally-inspired solutions to the problem of shelter - an increasingly important problem of modern society with its rapid over-urbanization.

A country's indigenous urban architecture is also a natural reflection of its people's concept of the use of space as well as its forms of social life and social organization, including its organization of its productive processes. Islamic societies, for example, all share a highly developed sense of personal privacy which is reflected in their traditional domestic architecture, where houses face inward. Architecture is at the interface of artistic and industrial design. It is, perhaps, the perfect example of the difficulty of establishing a boundary between artistic creativity and creativity of a more productive nature. Artistic creativity cannot easily be quarantined. It is often contagious and, inevitably, spills over into

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and influences other areas of activity, thus acting as a stimulus and catalyst. The active promotion of artistic creativity, therefore, cannot help but be of benefit to the development of a society as a whole.

Creative genius is an individual gift that can neither be artificially stimulated nor programmed. An environment could be created, however, which would encourage and stimulate the generation of new ideas focused either on a particular problem or on a selected range of problems. The ambiance created could act as a magnetic field in attracting other new ideas, thus establishing a virtuous circle with success engendering success. California's "Silicon Valley" cannot be replicated in a society that is incapable of providing, or unwilling to provide, the necessary stimulus for the creation of such an environment. One of the chief characteristics of a dynamic, entrepreneurial society is the inventiveness and innovative capacity that are inextricably linked to the value placed on new ideas and to an awareness of their potential for development.

4.3. Science and Technology in Development

Science and technology are not independent, isolated components in the development process. They are part of a human, economic and cultural setting which, in the final analysis, determines the chances of applying scientific knowledge that meets the real needs of the country. The technological developments in Britain which led to the Industrial Revolution were all based on real, local needs, and represented solutions that adapted best to the complex of economic and socio-cultural conditions prevailing in the country at the time.

Technology is neither a socially and culturally-neutral element which need only be imported and assimilated, nor is it a western invention implying the need to accept, wholesale, the lifestyles and forms of organization of the North Atlantic countries in order to be initiated into its mysteries. The introduction of any new technology is a cultural phenomenon which has a direct or indirect effect on the living environment as well as on the behaviour and the cultural values of the society concerned. Furthermore, cultural values are often a determining factor in the choice and impact of technology. The tacit assumption by many that North Atlantic cultures are superior to others hampers South-South dialogue and trade, as well as the exchange of experience and expertise with other developing countries, when the latter's experience, is more often than not, more relevant to the situation in other developing countries.

The experience of several South-East Asian countries has shown that impressive results can be obtained by the imaginative and innovative application of science and technology to development. Developing countries need to define their own priorities and objectives in the field of science and technology, formulate coherent science and technology policies reflecting those objectives, ensure adequate and appropriate scientific and technological training, and establish a research infrastructure for the promotion of research in areas likely to be of greatest benefit to their own development.

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The exercise of proper technological choice, whether of imported or of domestic technology, is generally recognized as an important factor in development. No particular technology can be considered *a priori* to be the most appropriate one for developing countries. The choice should be made in the context of local conditions, needs and interests and not on external ones. Given the range of competing technologies, this is not a particularly easy task, however, even when the choice is confined to only those technologies considered suitable for the country and situation concerned. Technological choice should not be regarded merely as a tactical decision, but should also be given a strategic role. Efforts should be made to identify, and to concentrate on, those strategic technologies which are particularly catalytic to development. Information technology, for example, has demonstrated its capacity to transform the manner in which work is organized and managed, and in which problems are analyzed and solved.

The adaptation of technological solutions to local conditions implies a greater use of local materials.In the provision of adequate shelter, for example, which is not only a basic, universal need but also one of the major problems of modern urban life, the development and use of local products in a creative and imaginative way could not only reduce costs, thus making it possible to provide more people with adequate shelter, but would also provide opportunities for the creative talents of architects and builders, and promote, at the same time, the development of aesthetic standards based on local tastes. In this respect, it has been noted that in Mali and in Cameroon indigenous architecture is particularly rich in local adaptations to climate and available building materials.[45]

Furthermore, since many developing countries share the same, or similar, local materials, successful technological breakthroughs in their development and use could well find a ready market in other developing countries. Bamboo, which can be grown in most sub-tropical countries, is one of the most versatile plants in the world. It is also one of the most fast-growing. It is an unparalleled source of timber, and the fact that it can be seasoned and jointed to form walls, doors, windows, roofs, ceilings, furniture, etc. provides it with immense possibilities for use in low-cost rural housing. Its other qualities such as the suitability of its pulp and fibre for high grade paper products, and its hay, which contains four times the amount of proteins of other fodder grasses, not only make it a very valuable "local" material, but also suggest that further research into other possible industrial applications could be fruitful.

The cost of energy is an important factor in the economic development equation, and for the vast majority of developing countries which do not possess fossil fuels it is quite often a crippling one. A partial alternative to fossil fuels, especially in rural areas, are renewable energy resources - wind, solar, hydro and biomass energy, which are all local resources, and are particularly suited for use with small-scale, decentralized energy systems.

During the last world fuel crisis (1979-1980), it was pointed out that a breakthrough in the use of solar energy as an industrial power source (which would be of immense importance to tropical countries) was unlikely to come from artisanal improvements in the

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performance of solar cells: "If solar energy is to provide the solution to the world's fuel crisis, that solution will not emerge from low-technology roof-top radiators. A breakthrough will come from applying quantum physics, biochemistry or other sciences of the 20th century. Today's technology-based industries all depend on new science".[49] Developing countries in tropical zones would, naturally, have a greater interest in investing in such research than would most developed countries. There are also certain new technologies such as biotechnology, which has immense possibilities, especially for agriculture, research in the applications of which could be of great benefit to developing countries.

No real progress, for example, has been made in the genetic improvement of sorghum and millet, which account for eighty per cent of cultivation in the Sahel and in other parts of Africa with very low and sporadic rainfall.[50] Also, since cassava constitutes the basic food crop of more than two hundred million people in more than thirty-five African countries, the development of disease-resistant varieties which could provide a higher yield than existing ones, would be an important achievement. This type of research is, however, unlikely to be considered a priority in the developed countries. Abdus Salam has emphasized that: "For any society, the problems of its agriculture, of its local pests and diseases, of its local materials base, must be solved locally. One needs an underpinning from a first-class base in basic sciences to carry through applied research in these areas".[51]

Strong demographic pressure, in most parts of Africa, has an increasingly adverse effect on the physical environment as well as on the level of the region's natural resources. The fruits of technological research, steered in directions relevant to the needs of the region, could be utilized, however, to reduce the rate of soil deterioration and to increase agricultural productivity. Success in this area would be an important victory in the continuing war against food insufficiency and malnutrition.

In this respect, it should be noted that the Food and Agriculture Organization (FAO) points out, in a current report[52], that the food situation in Sub-Saharan Africa is worse now than it was twenty or thirty years ago. The FAO envisages no improvement in the foreseeable future, under current policies, and estimates that in twenty years time the number of the undernourished in Sub-Saharan Africa will grow to some 300 million, almost one-third of the total population. The report indicates, however, that the picture could be a different one if events were to intervene to increase agricultural production more than is currently foreseen.

4.4. Participation in Development

It has been pointed out that only economies based on market institutions have demonstrated sustained economic growth, and that while not all economies with market institutions have grown substantially over time, no non-market economy has succeeded in this respect.[53] "Market" economies are based on free choice - choice on the part of the producer as to what to produce, choice on the part of the consumer as to what to buy, and choice, by

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the producer and the consumer respectively, of the price at which the product would be offered and at which it would be bought.

Market economies have seldom been successful over a long period without having systems of political choice comparable to those in the economic domain. It is such systems of political choice that are best able to establish the type of context in which genuine consensus on matters of national importance can emerge, and in which social and political conflict can be resolved, if not to the satisfaction of all, at least without creating a level of dissatisfaction that could cause subsequent social disruption. Whichever system of political choice is adopted in order to give expression to the aspirations of the people, it should be one that should reflect, as closely as possible, the socio-cultural characteristics of the society. In this respect, it may perhaps be more appropriate to emphasize the need for a democratic ethos which provides the framework for democratic action, and is reflected in a system that is culturally compatible, rather than the establishment of a western-type democracy as such. The latter is, perhaps, too loaded with specific attributes, and too associated with a particular political system which had evolved in a specific cultural context, and which may be difficult to replicate, in the specific forms which characterize that system, in countries with totally different political and socio-cultural traditions.

Democratic processes do not necessarily produce democratic results. That is why the mere transplantation of a particular democratic model from one culture, or from one country, to another will not necessarily take root if that model cannot be infused with an ethos of the receiving country's own.

It has been pointed out that in pre-colonial times, traditional societies in Africa were almost all ruled on the basis of consent, which is the essence of democracy, although they did not have all the trappings of western parliamentary democracy. "Despite the hierarchical system of traditional governments most of these [African] entities were democratically governed through group representation at the centre and village councils at the local level. The key operative concept for decision-making was consensus. The rulers had the authority but shared the power .... kings such as these [the Asantehene of the Ashanti people in Ghana], even when they reigned at the summit of strongly-centralized systems, could not do as they wished. The exercise of power had to conform to the rules set by the ancestral charters".[54]

On assuming office the Asante chief was reminded of these ancestral charters: "Appearing then before his people, he swears loyalty to them and is admonished by his senior councillors to remember, among other things, that he may never act without their advice, and must rule with justice and impartiality. It is impressed upon him that he belongs to the whole chiefdom in his capacity of chief and not to his own lineage."[55] If the chief failed in his duty, those who elected him possessed the constitutional means to depose him, and have often done so.

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Participation is implicit in a type of development that is not only for, but also by, the people. In the context of development action, experience has shown that consultation of the beneficiary populations, and their participation to as great a degree as possible, in the formulation and the implementation of development strategies and projects, invariably, and often dramatically, increase the chances of their success. The absence of such consultation and participation, on the other hand, has often been identified by development agencies, in post-project evaluations, as one of the principal causes of the failure of many projects to attain their objectives.

In industry, effective participation of workers and employees can produce dramatic results. A recent survey of the motor-car industry[56] has revealed that each Japanese worker makes an average of 61.6 suggestions (for improvement) per year, compared with an average of 0.4 suggestions per year by the American worker. The survey also revealed that it takes 16.8 man-hours to produce a car in Japan, 25.1 man-hours in the United States, and 36.2 man-hours in Europe.

The importance of decision-making in the development process is, also, often underrated. Timely decisions, taken at the lowest effective management level, and based on all relevant information necessary for evaluating a situation or a programme, are more likely to produce effective results than decisions made on an *ad hoc* or on an *ad personam* basis.

In the vast majority of developing countries, where a significantly large proportion of professionally-trained people is employed by the civil service or by quasi-government organizations, and where Governments play an important role in managing the economy, the civil service and the para-statal organizations should be regarded as an important management tool for development, and not merely as an administrative or a regulatory one. A management culture needs, therefore, to be developed which would place emphasis on producing results rather than on performing functions.

A management style that places emphasis on the administering of programmes and on the performance of functions would tend, at best, to promote efficiency rather than effectiveness, the criterion of which would be how faithfully instructions have been carried out and regulations observed. A management style, on the other hand, which places emphasis on results, which encourages decision-taking at the lowest effective management level, and utilizes rewards as well as sanctions to encourage initiative in obtaining the best results, would promote imaginative solutions to problems and would lead to increased innovation which are factors important to successful development.

The promotion of quality, whether in production, services or management, is also an important factor in successful development to which, perhaps, insufficient attention has been given in most developing countries. Over forty years ago, Japanese companies pioneered the use of Total Quality Management (TQM)[57], an innovative approach to efficiency and quality, the basic principles of which had been formulated by American quality experts but

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whose development owed much to the integration, by Japanese managers, of their own cultural values.

The TQM approach, which is increasingly being adopted by leading American businesses, is based on the assumption that in order to achieve quality, an organization should let those who actually perform particular tasks in the organization determine the best way to do them. Every employee, at all levels, is held accountable for quality and should therefore be trained to anticipate change, to identify problems and to take an appropriate course of action.

Developing countries could well consider such an approach to achieving quality, adapting it to their individual, cultural conditions, as has been done in Japan. TQM is an approach and a technique subject to no restrictions or patents. Its successful transfer to, and adaptation and application in, developing countries could, through a resultant increase in productive and managerial efficiency, possibly have a greater effect on development in general than would unrestricted access to any single, patented technology currently sought after by those countries.

It has been reported that African managers attending TQM training courses in the United States of America are struck by the similarities of TQM principles with some key concepts in the management of traditional institutions in Africa. Because of the relationship between the individual, his family and his community in African traditional society, and the sense of responsibility, generated by such a relationship, the benefits and consequences of individual performances had repercussions on the family or the community.

Furthermore, the solution to the problem, in certain regions of the developing world, of the lack of a culture of maintenance with respect to the physical infrastructure, which results in the rapid deterioration of roads, public buildings, capital equipment etc., with the consequent, additional cost of early replacement, could perhaps be sought, in the case of Africa, in drawing and building upon the traditional sense of individual responsibility to the group and to the community.

Finally, participation is, above all, the antithesis of exclusion or marginalization whether of minorities, immigrant groups or of individuals who, for one reason or another, drop out or are forced out of the mainstream of society. Not only is their potential contribution reduced or lost to the society, but their exclusion or marginalization, to the extent that it loosens the normal bonds such groups or individuals have with the society in which they live, becomes a destabilizing force which affects the cohesiveness of the society itself - a condition that is surely inimical to healthy development.

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Healthy development also means development with a human face, and such development should not overlook the special needs of certain groups in the society, who are not traditionally assimilated to the excluded or the marginalized, but who do require some measure of social protection. Hubert Humphrey, a former American Vice-President, eloquently drew attention to such groups some twenty-five years ago: "The real test of a society is how it treats those in the dawn of life (the very young), those in the twilight of life (the old), and those in the shadows of life (the sick, the infirm and the handicapped)."

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5. CONCLUSION

It is in the crucible of nationhood that culture forges the tools of modern development. In this respect, Europe had a big headstart on the rest of the world with the birth of the nation state, which was an outgrowth of the Renaissance and a vital factor in modernization. By the time the industrial-economic impetus had got underway, the nation state was there to provide the indispensable framework for development action.

Frantz Fanon has written lucidly on the importance of nationhood to a society if it is to achieve its creative potential: "The Nation is not only the condition of culture, its fruitfulness, its continuous renewal, and its deepening. It is also a necessity. It is the fight for national existence which sets culture moving and opens it to the doors of creation. Later on it is the nation which will ensure the conditions and framework necessary to culture. The nation gathers together the various indispensable elements necessary for the creation of a culture, those elements which alone can give it credibility, validity, life and creative power".[58]

Most developing countries have not only had a very short experience of cultural and national sovereignty in modern times, but for the vast majority of them such sovereignty was achieved at a period when the disparity in the level of development between them and the older nation states was already so great that it did not allow the former much room for error in their development action.

Each culture has its own forms of creativity which, because of a combination of circumstances, often fortuitous, have sometimes produced brilliant results in various stages of its history. There is no ready formula or recipe for such success, but an examination of the circumstances surrounding several successful examples in recent times indicate the presence of certain common elements - cultural confidence, inventiveness and innovation, creativity, political will and encouragement, importance accorded to knowledge and to education, and social rewards for individual success.

Successful modern economic management requires choices made on the basis of an analysis of all the pertinent information available, on the selection of the most competent people to implement the policies emerging from such choices, on a constant monitoring of performance accompanied by adjustments where required, on a system of rewards based on performance so as to encourage even greater effort in that direction, on the optimal use of resources e.g. skills, equipment, funds; encouragement of risk-taking, decentralization and delegation of authority and the active involvement of people - both as beneficiaries and as instruments. All of this often requires changes, sometimes fundamental ones, in cultural habits and attitudes, for example, in decision-making, choice of people on impersonal and

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not on personal grounds, acceptance and encouragement of a critical attitude, promotion on merit and not on friendship or kinship, encouragement of innovation which itself is antithetical to conservative traditions.

It should be pointed out that the practice of recruitment to, and promotion in, public office on the basis of merit formed part of the tradition of certain countries external to the West. China instituted an examination system for recruitment to the Imperial Service during the Sui Dynasty (581-618 AD), which lasted, with several modifications, until it was abolished in 1905. In England such a system was established only in 1870, and for much of the 19th century it was still possible to buy certain public posts. A European observer made the following comment in 1555, with respect to the Ottoman Empire: "No distinction is attached to birth among the Turks... It is by merit alone that men rise in the public service, a system that assures that posts should be assigned only to the competent"[39].

Rapid cultural change is an inescapable aspect of the era in which we live. Even the developed countries, with societies which have enjoyed high levels of stability for fairly long periods, face problems in assimilating such change. The developing countries which have had, however, to compress into three or four decades the type of changes engendered by modernization which had taken much longer in the industrialized countries, have not had the time to integrate such changes into their cultural assumptions and attitudes, especially since such changes, unlike the case of the industrialized countries, were the result of exogenous and not endogenous forces.

All societies, like all individuals, have a strong survival instinct, and existing societies have proved their ability to survive the problems they have faced in the past. Traditional societies have, in their past, been able to evolve at their own pace and to overcome internal and external challenges in their own manner. The pace of change in industrial societies in the past forty years, however, combined with the reduction of distances because of greatly improved systems of communication, electronic and physical, have placed developing, non-industrial societies in the situation of having to undergo transformation at a rythm their societies had not been faced with in the past, and for which their traditional responses have proved inadequate.

Although the developed countries are currently undergoing a crisis in their faith in the type of capitalistic economy and economic organization characteristic of post-industrial development, which has produced high levels of unemployment and of unemployables, as well as destruction of the environment, those societies have evolved naturally towards this stage, in accordance with local, national and regional cultural imperatives, without imposition from forces external to their culture. Most developed countries have never, in modern times, had changes imposed from outside, for any prolonged periods, which would have interrupted a continuous historical process, and undermined their faith in their ability to come up with their own solutions to their problems.

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The distortions produced by the western development model, as applied in the industrialized countries, have always in the past been corrected over time because these societies, unlike the developing-country societies, possessed internal self-correcting mechanisms. Thus there have been gradual adjustments, over the past few decades, to take cognizance of, and to reflect, such social and political developments in the industrialized societies as the growing importance given to the idea of participatory democracy and the active involvement of people at the local and regional levels of Government; decentralization of executive power both by business and by Government, the gradual change in the nature of worker-employer relationships from a confrontational one to one based on a recognition of convergent interests; growing participation of workers in the equity and even in the management of enterprises (including management and worker buy-outs); growing importance paid to the physical working environment in accordance with a greater emphasis, in the society as a whole, on the quality of life; flexible working hours to cater both for the needs of an increased number of women in the workforce and for the greater importance given, by the society, to leisure activities; greater importance given to the growing need of workers, below management level, to be more than mere automatons on an assembly line, by such innovative practices as the creation of quality circles and of small working teams in which the responsibility of team leadership is rotated; increased importance given to personnel management as opposed to personnel administration, etc.

There is also the ecology movement which is a reaction to the type of development aimed at maximum production and consumption of goods, favouring centralized, large-scale production facilities, and which paid little attention to the effect on the physical and social environment. The movement underlines the need for another type of growth and another form of decision-making in the relationship of people with their environment. It favours the fostering of the autonomy of communities and of individuals, and methods of production which can be carried out and monitored at neighbourhood and at community levels, which are not harmful to the environment, and which broaden the autonomy of local and regional groups.

The growing realization that normal economic growth is no longer sufficient to ensure full or near-full employment, a fact which has completely transformed the nature and the dimensions of the problem of unemployment, now considered to be the principal cause of the social crisis which almost all developed countries are now undergoing, has led to a national debate in some countries, centered around possible solutions such as a reduction in the number of hours worked, reduction in wages earned, or a sharing of available work so as to increase the number of people employed.

No external stimulus was needed for these changes, rooted as they were in the socio-cultural mores of the industrialized societies, but which did not preclude the adoption, in the West, of techniques and methods employed successfully, for example, in Japan like just-in-time inventories (*kanban*), autonomous, flexible work groups (*jidoka*), etc. Furthermore all the measures not only went hand in hand with changes in the society, but also helped to maintain and increase productivity.

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The western industrial model (1950's vintage) exported to the developing countries, which was quite ill-adapted to the socio-cultural conditions of those countries, underwent, by and large, no change except, perhaps, in certain South-East Asian countries, because it was regarded as **the** blueprint for development which had proved its success in the developed countries, and was therefore considered to be sacrosanct.

The period of colonial domination interrupted the natural process of development (slow as it may have been in pre-industrial and non-industrial societies), substituting external pressure and direction, in accordance with the interests of the metropolitan countries, for an internal dynamic in harmony with the aspirations of the local society. Subsistence agriculture, for example, with its local food crops, gave way to plantation agriculture producing crops for export. None of the products was processed locally, thus making impossible the creation of conditions for the type of agricultural revolution which had occurred in Europe and which led to the Industrial Revolution.

The substitution of the metropolitan language for the local language (where the latter was not simply banned) as the language of officialdom, of commerce and even of educational instruction, with consequent psychological dislocation; the destruction of cultural confidence by the imposition of external cultural values, considered superior; an educational system geared mainly to produce literate workers and not to train people for the higher productive processes of the economy, all constituted formidable obstacles to genuine development.

> "It is essential to consider cultures as 'cultural models for solving problems' and as models that can be applied equally to tradition and to modernity.... Culture must be seen as a 'strategic element that may evolve with situations and not as a deterministic framework conditioning human behaviour.... It is in a state of continual renewal. It is a dynamic force'".[60]

It would be instructive to take a look at certain characteristics of Japanese society which, without the hindsight of experience, could be considered to be "a deterministic framework" which would have a negative effect on development:

a) life-long guarantee of employment for workers;

b) decision by consensus;

c) subordination of individual interests to those of the group;

d) over-importance (in western eyes) of age and seniority in determining promotion;

e) gross under-utilization of female resources, and relegation of women to inferior positions in the economic life of the society.

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Several of the above characteristics, however, resemble practices in many developing-country societies, and which are considered to have a determining effect on their own development. Japan's success in utilizing its culture, with its specific characteristics, as a cultural model for solving problems, is certainly an argument against the commonly-held view that cultural traditions are necessarily an obstacle to development.

Loans for investment, and the establishment of client credit-worthiness based on prompt repayment of such loans, are an essential function of a modern economy. In several traditional societies in Africa, loans are granted in exchange for the pledging of an object of merely symbolic value, the debtor's honour thus being more firmly engaged than it would be with respect to a formal bank loan with the normal, legal guarantees. The high rate of loan repayment in the traditional financial system compared to the high percentage of non-performing loans in most of the formal banking system in sub-saharan Africa is evidence that a cultural tradition can sometimes be a more effective instrument in a development context than the classic, modern, "imported" one.[61]

Two of the basic principles of Japanese Zen Buddhism are *"Mu-jo"* - the principle of the impermanence of things, and *"Mu-shotoku"* - the non-profit principle. *Mu-jo* teaches that the present moment will never be repeated and that things are never exactly the same. This principle removes, therefore, any fear of change, and as a result, encourages innovation and constant adaptation. *Mu-shotoku* which enjoins one to act without expectation of a reward, or recompense, for the action undertaken, not only encourages dedicated work on the part of individuals even where there is no prospect of immediate reward, but is probably one of the reasons for the characteristic practice of Japanese business firms of favouring long-term policy rather than short-term profits - a practice which has given them a decided advantage over their western competitors.

Finally, Japan and the South-East Asian "dragons", while espousing the free enterprise system of the western development model, dosed it with more than a little government *dirigisme*, a form of paternalism alien to the West but totally in keeping with their own societies' traditions. Their striking success in this respect is a convincing demonstration that the term "value-added" should have a cultural as well as an economic connotation - that it should reflect "values" as well as "value".

Cultural confidence appears to be an essential factor in the development equation. It appears to bear a relationship to development similar to that which business confidence has with the economic climate in a developed country - essential elements of unknown quantity which cannot be predicted or programmed, but which, in the case of cultural confidence, provides that magic key which unlocks the cultural energy of a people.

History has witnessed several examples of explosions of such cultural energy which, though encompassed in brief periods of time, have catapulted civilizations to the forefront: the Great Wall of China, more than 3,000 kilometers long and constructed in the 3rd century B.C., which is considered to be the largest building construction project ever carried out, and

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is reported by astronauts to be the only man-made construction which can be seen from the moon; the Great Pyramid at Giza, built around 2,500 B.C., before the Egyptians knew either the wheel or the pulley, and which covers 5.3 hectares and contains 2.3 million blocks of granite and limestone, each weighing more than 2,000 kilos; also, the outstanding engineering achievements of the 15th century Inca Empire which, in that century, had constructed a 20,000 kilometre road system, comprising many rock tunnels and vine-supported suspension bridges over mountain canyons, and including two north-south highways each 3,600 kilometres long, as well as their system of irrigation with its aqueducts of cut and fitted stone (one of which was between 700 and 800 kilometres long), considered to be one of the wonders of pre-industrial civilization.[62]

These achievements, conceived, planned and carried out, in the case of the Great Wall and the Great Pyramid, thousands of years ago, still have the power to stun the imagination. These monumental constructions were the most obvious, and the most lasting, testimonies of the civilizations which produced them, but they were by no means isolated ones - they were part of a general spectacular development which affected all aspects of their societies. Cultural energy is the fissionable material of development, and the results of a country's development efforts are, to a large extent, determined by how successful it is in harnessing the cultural energies of its people, and channelling them in directions which respond to their own aspirations.

Development is a seamless web, whose fabric contains a multitude of interwoven strands. It is culture, however, which provides the colour, the texture, the weave, the resilience, the strength of that fabric.

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NOTES

1. *I have not attempted a definition of development. In this respect, I have followed John Stuart Mill's dictum: "A metaphysical nicety of definition is unnecessary when the ideas suggested by a term are already as determinate as practical purposes require."*

2. *This model, although it was, and is, an evolving and not a static one, has sufficiently retained its essential characteristics to merit use of the term.*

3. *This term is used in its broad sense, with the recognition that there are great differences in the history, experiences and economic condition of those countries normally included in this grouping.*

4. *John Stuart Mill, Principles of Political Economy, vol.3, cited by Edward Said in Imperialism and Culture, page 69.*

5. *Final Report of the World Conference on Cultural Policies organized by UNESCO in Mexico City, 26 July-6 August 1982, page 41.*

6. *Pierre PASCALION, The Cultural dimension of Development, page 1.*

7. *UNESCO Medium Term Plan 1990-1995.*

8. *The term development was first used to describe the modern process of economic development. It is used here, for lack of a better term, to also describe a process of expansion and improvement experienced by certain societies, during particular periods of their history, before the modern era.*

9. *Charles Singer, History of Technology, vol. II, page 756.*

10. *George Sarton, Introduction to the History of Science, vol.II, page 1040.*

11. *Basil Davidson, The Africans, p. 183*

12. *Constance Irvin, Fair Gods and Stone Faces, St. Martin's Press, New York, 1973, p. 115, citing S.G. Morley, The Ancient Maya, Stanford University Press.*

13. *Darcey Ribeiro, The Americas and Civilization, p. 131.*

14. *See Hugh Thomas, The Conquest of Mexico, Hutchinson, London, 1993.*

15. *Albrecht Dürer, Journal de voyages aux Pays-Bas, Editions Dédale, Paris, 1993, page 25 (my translation).*

16. *Basil Davidson, Africa.*

17. *See La culture et le développement techno-industriel.*

18. *Michel Leiris, Race and Culture in The Race Question in Modern Science, UNESCO, Paris, 1956, page 113.*

19. *Briffault, Making of Humanity cited by Abdus Salam in Ideals and Realities, page 182.*

20. *Charles Singer op. cit., vol.II, pages 766-67.*

21. *Charles Singer, op. cit., vol. II, page 756.*

22. *International Herald Tribune, 14 January 1994.*

23. *Reay Tannahil, Food in History, Penguin, London, 1988, p. 188.*

24. *Ali Mazuri, Cultural Forces in World politics, page 5.*

25. *The mitochondria are a part of the human cell which possess their own genes separate from those of the cell nucleus. Unlike other genes, the mitochondrial DNA are passed down only through the female line of inheritance, and mutate at a constant rate of 2-4 per cent per million years in all vertebrates. Such mutations represent quantifiable measures of change, and can act as a sort of genetic clock.*

26. *Jonathan Kingdon, Self-Made Man and His Undoing, page 256.*

27. *Jonathan Kingdon, op. cit., pages 69 and 101.*

28. *Jarel Diamond, The Rise and Fall of the Third Chimpanzee, page 35.*

29. *Jarel Diamond, op. cit., pages 106-107.*

30. *Peter Farb, Man's Rise to Civilization, etc., p. 210.*

31. *J. Bronowski, The Ascent of Man, pp. 69-70.*

32. *Joseph Roucek and Thomas Kiernan, ed., 'The Negro Impact on Western Civilization', page 434.*

33. *Michel Leiris, op. cit., page 117.*

34. *Joseph Needham, Precursors of Modern Science, article in UNESCO Courier, October 1988, page 7.*

35. *This paragraph and the following six are based largely on Daniel Boorstin's The Discoverers.*

36. *M. Ali Kettani, quotation cited in article Moslem contributions to the Natural Sciences in UNESCO's Impact of Science on society, vol. 26, N°3, 1976.*

37. *See Jacques Attali, 1492, Fayard, Paris, 1991, p. 62.*

38. *Daniel Boorstin, op. cit., page 516.*

39. *See Karen Armstrong, A History of God, pages 168-170.*

40. *See La culture et le développement techno-industriel.*

41. *Claude Lévi-Strauss, Race and History in The Race Question in Modern Science, UNESCO, Paris, 1956, page 152. For a discussion on this point, see also Darcy Ribeiro, The Americas and Civilization, pages 451-452.*

42. *Abdus Salam, Ideals and Realities, page 35.*

43. *See Theodore Zeldin, France 1848-1945, volume II, Clarendon Press, Oxford, 1977, pages 576-581.*

44. *Walter Rodney, How Europe Underdeveloped Africa, Heinemann, Kenya, 1989, page 10.*

45. *Michio Morishima, Capitalisme et Confucianisme, page 156.*

46. *Theodore H. Von Laue, The World Revolution of Westernization, page 31.*

47. *Michio Morishima, op. cit., page 300 (my translation).*

48. *June Tabaroff: "Bringing Cultural Heritage into the Development Agenda".*

49. *London Economist, 27 September 1980, quoted by Abdus Salam, op. cit., page 42.*

50. *See Erwin Northoff, La crise africaine et l'impact des sciences et des technologies, Le Courier ACP-CEE n°139, May-June 1993.*

51. *Abdus Salam, op. cit., page 37.*

52. *Agriculture : Horizon 2010, FAO, Rome 1993, reported in Le Monde of 9 November 1993.*

53. *Aaron Wildavski, How cultural theory can contribute to understanding and promoting Democracy, Science and Development, paper presented to a Conference on Culture and Development in Africa, World Bank, Washington, April 1992.*

54. *See Mamadou Dia, Indigenous management practices: Lessons for Africa's Development in the 90's.*

55. *M. Gluckman (ed.), Essays on the Ritual of Social Relations, Custom and Conflict in Tribal Africa, page 58, cited by Basil Davidson, The Africans, p. 82.*

56. *The Economist (London), supplement on the motor-car industry, 17 October 1992.*

57. *Damien M. Pwono Total Quality Management as a Strategy for Success, on which the discussion on TQM is largely based.*

58. *Frantz Fanon, The Damned, page 196.*

59. *Statement by de Busbecq cited by Noel Malcolm in a review of "The Ottomans" by Andrew Wheatcroft, Times Literary Supplement, 5 November 1993, p. 21*

60. *Xavier Dupuis, A Review of Methodologies for Integrating the Cultural Dimension in Development planning, page 12, citing Dominique Desjeux, La part cachée: Approche socio-culturelle des stratégies alimentaires dans les pays en développement.*

61. *See Mamadou Dia, op. cit.*

62. *Philip Mason, Patterns of Dominance, p. 68.*

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* *Papers presented at a UNESCO Seminar on Culture and Development, Paris, September 1991.*

** *Papers presented at a UNESCO Regional Seminar on the Cultural Dimension of Development in Africa, Abidjan, November 1992.*

*** *Paper presented at International Conference on Culture and Development in Africa, World Bank, Washington, D.C., April 1992.*